THE PRO AND CON MONTHLY

June-July, 1931

America's Oil Problem

An Analysis of the Present Situation
Supply, Demand and Production Costs
Important Steps in Tariff Controversy
Relief Measures in Recent Congress
Should the U. S. Control Importation of Foreign Oil? - - Pro and Con

The Capitol Building--Past, Present, Future

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The Congressional Digest

The Pro and Con Monthly

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The Congressional Digest is Indexed in the Readers' Guide

The CONGRESSIONAL DIGEST

June-July, 1931
Vol. 10 No. 6

The Nation's Capital--

---"In This City, Laid out by Washington and Created in His Name, is Located the Capitol of Our Nation, the Emblem of Our Union, and the Symbol of Our Greatness"

"The Capitol of Our Nation"--

Second of the Washington Pilgrimage Series

No building in America is so closely identified with the history and growth of the Nation as is the Capitol.

In determining the location for the Capitol, the innate judgment and engineering knowledge of George Washington were manifested.

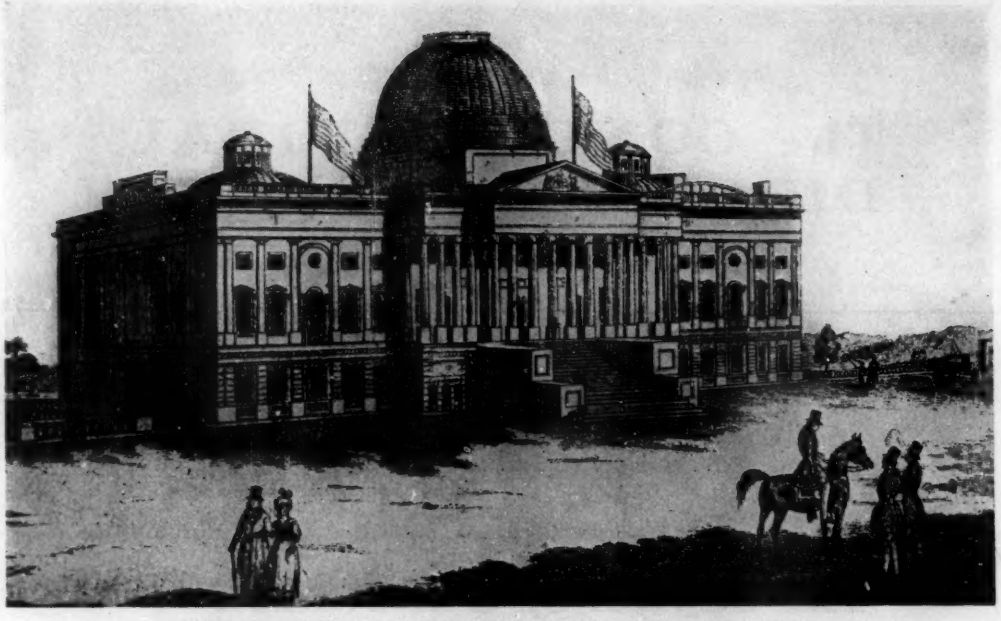
The First President selected a site on the highest plateau available, which has since become known as Capitol Hill, but generally spoken of by Washingtonians merely as "The Hill."

If one Washingtonian wishes to inquire of another what Congress is doing, he merely asks:

"What's happening on The Hill today?" and the other Washingtonian knows what he means. For what happens "on The Hill" is a reflection, to a large extent, of what is happening in the Nation.

The Capitol is the home of both branches of Congress, the Senate and the House, and also of the Supreme Court of the United States, until the new Supreme Court Building, now in progress, shall be completed.

All national laws are made under its towering dome and it is today, as it has always been, the mecca of all tourists who visit Washington, since every American citizen, from whatever State he comes, will find his own authorized representatives in both the House and the Senate.



I. The Original Capitol after its Completion in 1830

Photograph by C. O. Buckingham

II. The Capitol as it Stands Today with its Great Dome and Extensive Wings

III. The New North Approach to the Capitol, now under construction, to be completed for the George Washington Bicentennial in 1932. Under this landscaped area will run Washington's first subway. A mammoth underground garage for the use of members of the Senate and House is part of the plan

Concerning the Capitol Building - -

BY AN ACT of the First Congress of the United States, approved by President George Washington on July 16, 1790, the President was directed to appoint the necessary officials to carry out the work of building "The Federal City," and have it ready for the government to move from Philadelphia to the new Capital of the nation on the first Monday of December, 1800.

Like the Washington Monument, the Capitol Building has two corner-stones. The first was laid by President Washington on September 18, 1793, with Masonic ceremonies. The second, the corner-stone of the extensions, was laid on July 4, 1851, by President Fillmore, with Daniel Webster officiating as orator.

The North wing was finished in 1800 for occupancy by Congress. The South wing was finished in 1811, a wooden passageway connecting the two wings.

During the war of 1812, British troops occupied Washington on August 24, 1814, and set fire to the Capitol.

The wooden passageway connecting the two wings was completely destroyed and the wings badly damaged. They were promptly repaired.

In 1861, work on the extensions was practically suspended and the Capitol was used from time to time during the Civil War to quarter Union troops.

The Senate originally sat in the chamber in the North wing now occupied by the Supreme Court.

The original Hall of the House of Representatives is now Statuary Hall, each State having the right to be represented there by two statues. This hall is full of unusual echoes. Standing on certain stones one may speak in a faint whisper and be heard clearly on the other side of the hall. This is the most popular place in the Capitol with tourists.

All the mural decorations and many of the paintings in the Capitol were done by Constantino Brumidi, an Italian artist, who was exiled from Italy for political reasons. Finding freedom in America, he devoted the remainder of his life to making the Capitol beautiful.

Paintings in the rotunda depict the progress of American history. The paintings of Revolutionary scenes on the west curve were done by Trumbull from life. The paintings on the frieze at the top are still unfinished.

In the Trumbull picture of George Washington surrendering his commission as Commander in Chief of the American armies are two young girls who, apparently, have five hands between them, another curiosity to the many sightseers.

Several of the statues on the East front of the Capitol and the Statue of Freedom on the Dome were done by William Crawford, an American living in Rome. He died in the midst of the work, but it was all completed by his wife, assisted by master masons who had worked under Crawford.

The bronze doors at the east entrance of the rotunda were done by another American, Randolph Rogers, and are considered among the most beautiful in the world.

While originally Presidents were inaugurated and took the oath of office inside the Capitol building, for more than half a century they have taken the oath on an outdoor platform at the foot of the steps on the East front of the Capitol, in full view of throngs of citizens. Vice-Presidents still take the oath in the Senate chamber.

The total cost of the Capitol and grounds up to 1911 was $25,400,000. In 1927 the assessed value of the Capitol and grounds was $37,500,000.

The famous dome, made of cast iron and completed in 1865, weighs 8,909,200 pounds. On top of the dome is the bronze statue of Freedom, done by Crawford.

Since the Capitol was begun in 1792, there have been but seven official Architects of the Capitol. The first was Dr. William Thornton, designer of the building, 1792. He was followed in order by Benjamin H. Latrobe, Charles Bulfinch, Thomas U. Walter, Elliott Woods, and David Lynn.

This Month's Pro and Con Feature

America's Oil Problem

Foreword

ONE of the most important national problems the next Congress will be called upon to face is the oil problem. The tremendous increase in the output of American oil fields during the past few years has resulted in a surplus of oil. The effect of this, in spite of increased consumption, has been to drive down the price of oil to a point that has caused heavy losses to oil producers in some sections of the country.

Various remedies for these conditions have been suggested, but the independent oil producers insist that a tariff or an embargo on foreign oil, or both, are the only means by which the American oil industry can be saved.

Curtailment and proration of domestic production are already in effect to a certain extent as the result of voluntary agreement within the industry. Curtailment is, of course, lowering of production, while proration involves an arrangement by which each oil field agrees to produce only a certain percentage of the entire output of all the producers involved in the agreement.

During the coming summer efforts will be made to reach an interstate agreement, on the part of those states in which oil is produced, for proration and curtailment, under a general conservation plan.

The independent producers, however, maintain that neither curtailment nor proration will solve the problem so long as foreign oil is permitted to come in free.

Bills for a tariff and an embargo will be immediately reintroduced at the next session of Congress and pressure will be brought for their prompt consideration by the committees to which they are referred, with the idea of bringing them to a vote before the end of the session.

The recent development of new wells in Eastern Texas has given added impetus to the demand for a tariff, since these wells are outside the territory covered by existing proration agreements and their output threatens to further flood the market and force an even lower level of prices.

During the closing days of the past session of Congress a determined effort was made by Senators from the oil-producing states of the Middle West and Southwest to have the Senate adopt a resolution for a Senate investigation of the oil situation.

In an attempt to force a vote, Senator Elmer Thomas, Oklahoma, Democrat, conducted a filibuster which held against all but the most urgent legislation during the last two days of the session but which was not productive of the result he desired.

Prior to this, efforts had been made to bring about a vote on the bill of Senator Arthur Capper, Kansas, Republican, for a limited embargo, for a period of three years, on the imports of foreign oil. The Capper bill was reported by the Senate Committee on Commerce but did not come to a vote in the Senate.

Additional efforts had been made in both the House and the Senate to have a tariff placed on importations of crude oil and fuel oil, but these, also, had met with failure.

Undaunted by their defeats, the proponents of tariff and embargo announced shortly after Congress adjourned that they would renew their efforts at the next session of Congress. It seems probable, therefore, that the oil controversy is certain to receive serious consideration during the first session of the Seventy-second Congress, which will begin on Monday, December 7.

Back of the movement for an embargo or a tariff on the importation of foreign oil is the Independent Petroleum Association of America. This organization comprises the independent oil producers of what are known as the Mid-Continent oil fields.

They base their appeal for tariff protection on the ground that they are virtually shut out of the markets of the Eastern States because oil from Venezuela and other Central American points can be produced and delivered to those markets more cheaply than the Mid-Continent oil and that the result is that the Mid-Continent oil producers are being ruined.

According to statements made by the Independents, as they are called, the Standard Oil Company, prior to 1912, had a virtual monopoly on oil production, refining and distribution. In 1912, the Standard Oil Company was dissolved by order of the Supreme Court of the United States.

Following the dissolution decision, independent oil operators again entered the field and built up a large industry.

The Standard and other large oil companies about this time turned to Central America and Mexico for new fields and obtained valuable concessions.

The rapid development of the motor industry, and the increasing use of oil as fuel aroused the interest of the entire world in oil and conservationists began to consider

Continued on page 168

Important Steps in the

1921: The tariff bill of 1921, as reported by the House Committee on Ways and Means, provided for a tariff of 35 cents a barrel on crude oil and 25 cents a barrel on fuel oil. When the bill reached the House, President Harding wrote to Representative Fordney, Michigan, Republican, Chairman of the Committee, as follows:

"I can not refrain from expressing the hope that your committee will take note of the foreign policy to which we are already committed, under which the Government is doing every consistent thing to encourage the participation of American citizens in the development of oil resources in many foreign lands.

"This course has been inspired by the growing concern of our country over the supply of crude oil to which we may turn for our future needs, not alone for our domestic commerce, but in meeting the needs of our Navy and our merchant marine.

"To levy a protective tariff on crude petroleum now would be at variance with all that has been done to safeguard our future interests. I can readily recognize the claim of some oil producers for a protective tariff on their product, but such a course of temporary relief would be so thoroughly out of harmony with the larger policy which I have had in mind that I should be more than disappointed if Congress decided to levy a tariff on imported oil.

"The oil industry is so important to our country and our future is so utterly dependent upon an abundance of petroleum that I think it vastly more important that we develop an abundance of resources rather than temporary profit to a few producers who feel the pinch of Mexican competition."

As a result of President Harding's letter the provision for a tariff on crude and fuel oil was stricken out of the bill by the House. An effort to restore it to the bill was defeated in the Senate.

The importance of oil as fuel became widely appreciated during the World War which had given an impetus to the development of oil-burning ships, and the use of motor transportation. Following the Armistice there was a general scramble among the leading nations for the acquisition of oil fields. The larger American oil companies had already obtained concessions in Mexico, Colombia and Venezuela. Much of the friction between the Governments of the United States and Mexico during the Wilson administration developed on account of American oil concessions.

Following the World War the Governments of Great Britain and the Netherlands became interested in oil concessions in foreign lands and began getting control of various fields through the Royal Dutch Shell Co. Later Soviet Russia began the development of her own oil resources.

1921-

1924: The growing discussion of the oil question led President Coolidge to appoint four members of the Cabinet as the Federal Oil Conservation Board—the Secretaries of War, the Navy, the Interior and Commerce. The duties of the Board were to study the oil supply of the United States and make recommendations for its conservation.

1928: The Federal Oil Conservation Board, in a report to the President recommended legislation to check what it considered overproduction in American oil fields.

1929: In a report to the President of February 25, the Oil Conservation Board made the following statement concerning American oil resources:

"The United States is preeminently the chief producer of oil in the world. During 1928, Texas and Oklahoma each produced more petroleum than the three leading foreign countries—Venezuela, Russia, and Mexico—combined. The total production of the 20 oil-producing States was about 68 per cent of the world's crude oil production, while our domestic consumption, exclusive of the addition to storage, was approximately 64 per cent of the world total. Contrasted with these large percentages for a single country are the figures for all the other countries, whose demand for petroleum products must now tend to increase, possibly even more rapidly than our own demand. Roughly the United States is producing and consuming twice as much petroleum as the rest of the world. Our distribution of oil to other countries, chiefly in the form of refinery products, is a large and notable item in world trade.

"Neither the high rate of domestic consumption nor the excess of exports over imports would be disquieting if the petroleum resources of the United States bore anything like the same ratio to the world's resources as the production ratio of 68 per cent. According to the present opinion of our best petroleum geologists, our total resources, instead of being 68 per cent of those of the world, are not more than 18 per cent. If our petroleum reserves are not to be drawn upon at a faster rate than those of all other countries, our resources should be several times larger.

"The obvious inference is that the United States is exhausting its petroleum reserves at a dangerous rate. If the international comparison is made, this country is depleting its supply several times faster than the rest of the world. How real is the danger expressed in this fact and what remedy can be devised are questions confronting the American people as they plan for the future. At least, the effort should be made to propose measures that

Oil Tariff Controversy

will minimize and delay the undesirable future outcome of this excessive drain upon a limited though admittedly large reserve. In this planning for the future the principal units of the oil industry itself, with their large refinery capacity and distribution systems, both domestic and foreign, have a stake second only to that of the Nation and may well be counted on to join forces in the common interest. The depletion rate of our own resources can be brought more into accord with that of foreign resources only in one way—by importing a greater quantity of crude petroleum."

On June 10 a conference of the petroleum industry, known as the Governors' Conference, met at Colorado Springs, Colo., to consider the working out of a compact among the oil-producing states for the curtailment of production.

Under the provisions of the Sherman Anti-Trust Act a combination of oil-producing companies to control production would be illegal. A compact between States to enact laws to control production would, however, be legal, if duly ratified by the Congress of the United States.

The Colorado Springs Conference, which was attended by the Governors of several of the oil-producing States, adjourned without reaching an agreement.

During the consideration of the tariff bill by the House efforts were made to have a duty placed on oil, but they were unsuccessful.

1930: On January 16 the Governors' Conference went on record in favor of an embargo on oil.

Agitation for a tariff on oil had not been particularly strong during the consideration of the tariff bill by the House Committee on Ways and Means, but became vigorous after the tariff bill had been passed by the House and was up for consideration on the floor of the Senate.

At the urgent request of members of the House from the oil-producing States, however, the Ways and Means Committee held a general hearing on February 8 on proposals for a tariff on oil. No bill was reported.

During February and March while the tariff bill was being voted on section by section on the floor of the Senate several amendments for a tariff on oil were offered but all were defeated.

1931: On February 15 representatives of the Governors of the oil-producing States known as the Oil States' Advisory Committee, met in Washington to consider plans for an interstate agreement for the coordination of oil conservation methods in those States. This committee appeared before the Oil Conservation Board and an agreement was reached whereby it would submit its recommendations to that Board.

On March 7 Secretary of the Interior Wilbur, as Chairman of the Oil Conservation Board, appointed, at the request of the American Petroleum Institute, a volunteer Committee on Petroleum Economics to survey the supply and demand factors in the petroleum industry for the six months' period beginning April 1 and ending September 30, 1931.

On March 16 Cicero Murray, of Oklahoma, Secretary of the Oil States' Advisory Committee, requested hearing before the Oil Conservation Board.

On April 9 the hearing was held, being thrown open to all interested in oil conservation. The Oil States' Advisory Committee presented its program for the coordination of state conservation efforts. On April 10 Secretary Wilbur sent the plan to the Governors of the States interested with the following announcement:

"The Oil States' Advisory Committee, including representatives of the Governors of the States of Oklahoma, California, Texas, Louisiana, New Mexico, Kansas, Wyoming, Ohio, Colorado, and Arkansas, under the Chairmanship of Mr. Cicero I. Murray of Oklahoma, presented to the Federal Oil Conservation Board on April 9 a program for coordination of conservation efforts of these States, by means of an interstate agreement. I inclose the statement which they submitted. Their recommendations were as follows:

" 'I. That the Federal Oil Conservation Board continue its Voluntary Committee on Economics, to make periodic examinations into the status of the oil industry and formulate National and regional forecasts of supply and demand, and that such forecasts be given due consideration by the interstate committee and recommended, with any necessary modifications, to the respective State conservation bodies.

" 'II. That the Legislature of each oil-producing State be requested as rapidly as possible to authorize negotiation of an interstate agreement for coordination of conservation measures, any such agreement being subject to ratification by the States.

" 'III. That pending the working out of such a compact, an advisory committee, representing the several oil producing States, continue to function as a liaison and fact-finding body, to present to the conservation authorities of the various States, at such times as may be deemed necessary, recommendations for more effective cooperation as between the States.'

"I am pleased to advise you that the Federal Oil Conservation Board believes that this program of the States is constructive and it will give the States what cooperation it may looking toward a conservation agreement hav-

ing Congressional approval. The first of your Committee's three recommendations will accordingly be carried out by continuing the work of the Board's Voluntary Committee on Economics in making periodical examinations and formulating National and regional forecasts of supply and demand, to be transmitted for consideration of the States through the interstate committee.

"The other two recommendations call for action by the States, rather than the Board. This Board has in the past suggested an interstate agreement to provide for uniformity in State conservation laws on certain major points, such as (1) unit operation, (2) protection against waste consequent on overproduction, and (3) conservation of gas energy, coupled with coordination between the States of their conservation efforts under an arrangement for liaison which will insure that curtailment in one State may not be followed, as at present, by unproportional production for another State.

"This Board stands ready, therefore, to give what assistance it can in working out a rational plan which must, however, adequately safeguard the National interest. The States, which possess the necessary police power, must be the active factors.

"We shall accordingly await the further action of the respective States on the two features of your committee's recommendation which call for State action, i.e., authorization by the legislature of negotiation of such an interstate agreement, and continuation, meanwhile, of some liaison body, such as your present committee. We assume that we will hear from you when we can be of further assistance. The sooner that unified and constructive action is taken by the States, the better for everyone concerned."

This plan will be considered at a convention in Denver, Colo., in August.

On April 15 the Voluntary Committee on Petroleum Economics made its report on the present supply and demand. (See page 172, this issue.)

On April 24 the Independent Petroleum Association of America, at its annual convention at Tulsa, Okla., voted to continue its efforts for a tariff on oil imports and to establish permanent headquarters in Washington with Russell B. Brown, its secretary, in charge.

Foreword - -

Continued From Page 165

the oil supply of the world and to speculate upon how long it would last.

Their investigations resulted in the adoption of a policy by the American Government of encouragement of American capital to go into foreign fields and develop an oil supply to guard against the time when the American supply should be exhausted.

In support of this policy the Government has opposed the placing of a tariff on oil on the ground that it would be unfair to the American companies which it has encouraged to develop foreign oil fields, to shut their oil out of the American market.

Those appealing for a tariff take the position that but few Americans are dependent upon the foreign fields for their livelihood whereas many thousands are dependent upon the domestic fields and that unless a tariff is levied the American Independents will be ruined.

The opponents charge that the application of the protective tariff to oil imports will inevitably raise the price of gasoline and fuel oil to the ultimate consumer and that every manufacturer, farmer and householder will have to pay for the protection of the domestic oil producer in increased fuel and motor oil bills.

Those government agencies which advocate conservation take the position that it is the wiser policy to admit foreign oil and hold the supply of domestic oil for the future.

The advocates of restricting the use of oil and gasoline in America to American produced oil maintain that there is no need whatever for conservation beyond the point of normally wise regulation of production, since there is oil enough in sight to last for more than one hundred years and that even if the natural oil supply is exhausted, there will still be an abundance of oil to be obtained from shale and coal to last forever.

To the average citizen, the important question involved is how the outcome of the controversy will affect his daily cost for gasoline for his automobile and his cost for fuel oil in case he heats his house with an oil burner.

If he be interested in manufacturing, where fuel oil is used in the operation of his plant, or if he be a farmer, where the price of gasoline is a vital matter to him in the operation of tractors or trucks, his problem is the same.

Thus the average citizen is concerned with the question of whether he will obtain cheaper gasoline and fuel oil by having foreign oil on the free list or by having a tariff levied against it.

Involved in this problem is the buying power of those sections of the country where oil production is the major industry. The Independent oil producers claim that if they are forced to close their wells on account of the competition of foreign oil the resultant depression will be reflected in business all over the country.

Their opponents reply that the troubles of the oil producers are due to overproduction and that their present plight is an inevitable result of that fact.

Since the question of a tariff or an embargo is the predominant one for the immediate future, the DIGEST has emphasized that phase of the problem in the Pro and Con section.

The Alluring Quest for Oil

How It is Found

PETROLEUM is one of the oldest natural products used by man, but so secreted is this invaluable gift of Mother Nature in the dark recesses of earth's great storehouse, that no one is really sure whence petroleum came, what its origin, or how extensive the supply.

This does not mean that nothing is known about petroleum.

On the contrary, we know a great deal about it, but petroleum lore is ever changing. Every generation, every decade, indeed every day, adds to our knowledge, disclosing errors or deficiencies in our conclusions of yesterday.

We know that petroleum is composed principally of hydrocarbons. That is, it consists essentially of the two elements—hydrogen and carbon. Very simple! But these two elements by uniting in varying proportions with each other and with a number of other elements form a multitude of compounds—solid, liquid and gaseous—each having distinct properties. In petroleum itself is found a host of hydrocarbon compounds, and all petroleums are by no means identical in composition and properties.

In commerce petroleum is usually termed "crude oil." It is the raw material from which a great many products are made at petroleum refineries. It is sometimes thick like tar, sometimes oily and heavy like amber-colored cream, and sometimes light and volatile like the gasoline which it yields. In color it ranges from almost black, yellow or brown, through shades of green, to colorless.

Petroleum is commonly classified as paraffin-base or asphalt-base, from the nature of the residue left on distillation; or, if it contains both paraffin and asphalt, it is known as mixed-base.

Petroleum occurs and is found with natural gas beneath the surface of the earth. It is usually, but not invariably, associated with salt water. It is a mineral.

Exactly how was petroleum created?

The scientists know some important things about this. They take us into a fascinating study of the earth's crust. They take us back millions of years—into a geologic yesterday.

Inorganic theory: Inasmuch as it is possible to form hydrocarbons by certain reactions with metallic carbides, some investigators have thought that petroleum may have been formed in the earth by chemical reactions in connection with great volcanic disturbances which, accompanied by great heat, tore the earth asunder. This is known as the inorganic theory.

Organic theory: Almost all students of the subject now agree that remains of plant and animal life—organic materials—buried with the rocks are the true source of petroleum and natural gas; that the essential hydrogen and carbon came from these remains. This is known as the organic theory.

The crust of the earth is made up of three types of rock—sedimentary, igneous, and metamorphic. Natural hydrocarbons like petroleum and natural gas are almost exclusively found in association with sedimentary rocks. Long and precise study of wells drilled for oil—of the formations penetrated by the drill—have determined this. Hence science in its search for the origin of oil is particularly curious about sedimentary rocks—what they are, how they came to be.

Sedimentary rocks are mainly shales, limestones, and sandstones. Scientists study samples. They break them up and study them under high-powered lenses.

Shale, they find, is merely clay or mud more or less compacted. Oil shale under a microscope reveals remains of algae, of insects, fishes, and many other forms of life, besides considerable quantities of formless organic substance, probably a mixture of all.

Limestone they find to be made up mainly of the remains of lime-secreting organic life, which may be microscopic in size or in larger forms such as corals or shell fish.

Sandstone is not of immediate interest in tracing the source of petroleum, but has another very important relation to petroleum, which will be discussed later.

Sedimentary rocks take their name from sediment. The sediments from which they were derived were laid down on the earth hundreds of thousands, millions of years ago by wind, water, or ice. Throughout the ages rivers flowed into ancient seas carrying great volumes of mud and sand and vegetable and animal matter, depositing this silt in great plains along their courses and upon the ocean bottom. Day by day, year by year, through millennium after millennium, the deposits were distributed layer upon layer over the floors of the seas, and a series of compacted muds and sands was built up. Squeezed by the weight of overlying silt, crushed and broken and thrust about, the seas buried by the movement of the earth's crust, slowly these muds and sands of the geologic yesterday became the shales, limestone, and the sandstone—the sedimentary rocks—of the geologic today.

Sedimentary rocks are found buried widely in the earth's crust. They are in many cases heaped in a disorderly manner, and in other cases carefully sorted and laid down like blankets, covering hundreds of square miles.

The ancient seas have disappeared, but far inland these rocks containing the remains of tiny marine plants and fishes are now providing evidence of their previous existence; while the drill of the oil man in Oklahoma, Texas, and other interior points, discloses further evidence of these seas in the shape of subterranean deposits of salt water.

Science, tracing the origin of petroleum, regards as extremely important the evidences of plant and animal life found in shales and limestone. It has taken sedimentary rocks, which locally contain large quantities of organic material, and has, by heating, produced petroleum!

Weighing the evidence, science assumes that in *some manner* plant and animal organisms similar to those found in shales and limestone were the origin of oil.

It is believed that these minute organisms, buried in the seas by new muddy deposits, sealed from the air and protected from the ordinary processes of decay by the brine of the ocean itself, were subjected to slow decomposition and yielded, among other products, the petroleum of commerce. Science calls these organisms the "source material" or "mother substances" of petroleum. The shales and limestones it calls the "source rocks."

Science has found buried in the rocks the "source material" from which petroleum may be produced under the proper conditions, but this does not mean that this organic material is necessarily or even commonly buried in the sediments in the form of oil.

In other words, while all of the world's petroleum is found in intimate association with sedimentary rocks, not all sedimentary rocks contain oil. The existence of the oil, especially of commercially recoverable quantities, is limited very definitely to a few beds that have been subjected to conditions favorable to the making of petroleum.

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In what manner was petroleum generated from these "mother substances"? This is one of the great unsolved problems of petroleum geology.

One of the theories is that oil was formed from its mother substances relatively soon after these were buried in the sediments through the action of bacteria and various chemical reactions associated with that action. This is the so-called bio-chemical theory.

Another suggests that when the sediments containing the organic matter were subjected to high pressures, possibly accompanied by local and temporary high temperatures, this caused the change of part of the organic material into the form of petroleum.

Still another group of scientists holds that much of the petroleum originally was deposited with the sediments in the form of free oil, disseminated in minute globules.

It is entirely possible, and even probable, that while no one of the various theories completely explains the generation of oil, each is a true explanation which is applicable in certain instances.

Man thus theorizes on the origin and generation of petroleum. He then comes face to face with a mystery as difficult to solve—the problem of the early migration of petroleum.

Oil has moved! It has migrated. Shales and limestone containing the source material are relatively compact and impervious rocks. Oil in some way has left them and gone out into more porous ones. Thus it is found that the shales and limestone contribute most of the source material for petroleum, while the sandstones afford the most common reservoirs. Sandstones constitute sands or rocks that are porous and capable of holding a considerable percentage of fluids.

The porosity of a rock or sand is a measure of the openings or voids it contains. These voids depend in size upon the way the sand or rock has been broken up, the size of the slabs, the pebbles or particles, and the manner in which they have fallen or are packed together in the stratum. Voids vary from caverns down to minute pores.

The oil producer drills down through the rocks and brings up cores, or samples. The scientist submits these samples to tests to determine the porosity of certain formations and thus to find out the possibility of the accumulation of oil in these formations, and, if oil is present, the possible amount of oil which fills the openings of the strata from which the sample was taken.

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How has petroleum migrated through the rocks to its present reservoirs, and why has it accumulated in certain places and not in others? Here we come to the problems that make the discovery of petroleum the fascinating and hazardous game that it is, the exacting and perplexing science it is.

If the oil was buried with the sediments in the form of free oil, or if it was formed by bio-chemical agencies soon after the sediments were laid down, it seems probable that, as the rocks were compacted under the weight of other sediments laid down on top of them, the petroleum was squeezed out of these shales and limestone along with the large quantities of water that they contain. On being squeezed out, the oil is supposed to have found its way into beds of sandstone or other porous rocks in which further migration is relatively easy.

The geologist has determined that after oil entered the more porous rocks it traveled either alone or with water through pores of sandstones, or through larger openings such as systems of fissures, or through cavernous beds of limestone. Its impetus and course were influenced by pressures of rock, by water and gas, as well as by the force of gravity.

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Oil floats on water. In its early migration with water it sought the highest possible points along its course. Wherever opportunity offered, the oil worked its way upward from one bed to another and tended to gather along the roof of its porous carrier bed. Then at last it found it could go no farther. It was stopped wherever this porous bed had an impervious cap and wherever the bed was arched or domed in such a way as to form a closed trap.

Often the geologist can locate, by what he knows of the rocks, the anticline, or dome, which should be favorable for oil accumulation. He determines that possibility not only by the attitude or inclination of the rocks but by the physical properties of the rocks themselves. But only the drill can determine that oil has, or has not, lodged there.

If the drill finds oil in commercial quantity, the reservoir is commonly termed an oil pool.

Petroleum has been found on every continent. Geologists say no stratified rock is so young nor scarcely so old as to preclude its existence. However, rock formations occupying perhaps half the earth's surface are ruled out as being unfavorable for oil accumulation.—*Extracts, see* 1, *p.* 192.

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How It is Produced

WHEN the geologist has become reasonably convinced that he has found a spot where indications are favorable for the discovery of oil, and when the preliminaries such as leasing agreements and acquiring titles have been completed, it becomes the driller's turn to step into the picture.

The cost of drilling (and therefore the cost of the oil, if any is produced), depends on the distance of the field from existing railroads and supply points and upon the character of the drilling that has to be done. The first successful oil well in America was only 69 feet deep, but recent California wells have been driven well over a mile into the earth's crust. The expense of drilling generally increases rapidly per foot the deeper the drill goes, and if the well proves to be a producer, the lifting or pumping expense of getting the oil out after it ceases to flow under its own gas pressure is higher. The customary royalty, which is the land owner's share when drilling operations on his land are successful, is one-eighth of the oil produced. Sometimes, where a field is clearly outlined so that the chance of a dry hole is slight, or where other conditions are so favoring as to make a lease particularly valuable, the owner may get as much as one-sixth of the oil or a substantial cash bonus.

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The first oil well was drilled without the aid of other than human power, by means of what was called a spring pole. This was nothing more or less than an adaptation of the simple lever with a rope running through a pulley block and a weighted tool at the end. Two men alternately pulled the spring pole down and so raised the tool, and then released it and dropped the weight on the ground. Much the same process is used today in starting a well and in many cases all the way through. Thus in place of the spring pole there is a huge towering derrick with a crown block carrying pulleys at the top and in lieu of human muscles a steam or oil engine.

There are two kinds of derricks, the older type of which is built of heavy timbers and boards. This derrick can only be used once, since the cost of tearing it down and refitting it would be as much as that of a new derrick, so it is usually left standing on the ground even if the well proves to be a failure. In late years there have been erected many skeleton-like steel derricks and oftentimes these are unbolted and erected again on a new site. It is an interesting sight to watch a skilled crew of carpenters erect wooden derricks in a field where it is a race to see who can get his wells in first. Under pressure of competition and a bonus, six men will erect and turn over complete to the driller a wooden derrick in five days. One of these derricks rises from 80 to 120 feet in the air. It has a base about 20 feet square and the frame narrows to a top about 4½ feet square. Boilers, ropes, steel cable, engines and many tons of drilling tools have to be hauled to the site before the driller is all ready to go ahead.

The two most common methods of drilling in the United States are the standard and the rotary. The standard is much the older system. The nature of the structure to be drilled generally determines which plan shall be followed. Sometimes better progress is made by using one system part way and the other to complete the well. In the standard system a string of very heavy tools is raised and lowered by means of an old-fashioned walking beam, counterbalanced. The drill at the bottom of the cable drops on the rock at regular intervals and forces its way little by little through the various formations. The other system commonly met with, the rotary, consists of a very heavy circular steel platform which turns on the floor of the derrick, with a rectangular slot in the middle through which tools are lowered. This turning table looks something like a huge grindstone lying on its side. As the table rotates a string of tools acts like an auger. A continuous stream of water is forced down the hole around the bit and flows back between the drill pipe and the wall of the well to carry out the loosened material. The rotary system is used where soft rock is encountered, as in Texas, California, and Louisiana, and usually "makes" more feet per day. The standard system is relied upon where hard rock formations are found.

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Where oil is found it is in what are known as "sands," of varying thickness and at various depths under the surface. Some of the most prolific fields in Texas and Oklahoma have been found at from 2,500 to 3,000 feet. In California the big wells of recent years have been from 4,000 to 6,000 feet down. Frequently the well gets production from a shallow depth and subsequently discovers a second or even third and fourth sand by going to lower horizons.

Usually when the hole reaches oil sand the result is like pricking a balloon. The gas pressure held back for thousands of years forces the oil towards the hole and upward with great force. The drilling tools are withdrawn from the well, a valve at the top closed and another at the side opened to allow the oil to flow into receiving tanks or temporary open pits. After a time its flow diminishes as the gas pressure is reduced and eventually it ceases to flow naturally, when pumping or other methods are used.

If the oil does not flow naturally or freely, the well may be "shot." Long tin canisters of nitroglycerin are lowered by expert and experienced hands to the bottom of the hole and then exploded to open the seams for the flow of oil.

As the oil comes from the well it flows through separating tanks where much of the gas is captured. If this gas contains gasoline vapors it is run through a compression and absorption plant to permit the recovery of light gasoline. The crude oil itself is run into what are known as flow tanks, from which it is either delivered to the pipe line or railroad tank car, or placed in steel storage to be held until needed.—*Extracts, see* 2, *p.* 192.

America's Oil Supply and Demand - - An Official Survey

Committee on Petroleum Economics

by E. B. Swanson, Chairman

IN considering the probable demand for gasoline during the April to September period of the present year, the Committee on Petroleum Economics of the Federal Oil Conservation Board has reached the conclusion that the effects of the business depression would remain as an unfavorable factor during the first two months of the present period and that conditions comparable with those of the preceding year would not be encountered until these first two months had been passed. The Committee also concluded that domestic demand during the final month of the 1930 period was somewhat higher than normally could be expected and, consequently, estimated for September a domestic demand slightly lower than that recorded for September, 1930. Having taken these divergent tendencies into account, the Committee estimated that the domestic demand for gasoline will exceed that of the preceding year during June, July, and August and that April, May, and September domestic demand will not equal the 1930 levels.

Through data courteously furnished by the various State officials concerned with the collection of gasoline taxes, the Committee studied the respective trends in gasoline demand in various sections of the country. These local differences were taken into account in preparing the estimates of gasoline production in the different refining areas. It is suggested, however, that local differences in demand are of such importance that each individual producer should consider carefully the relationship of local demand in the area served with the national tendencies estimated in the Committee's report.

Other factors of importance, such as trends in automobile registration, cars in use and those replaced, as well as recent data on production, were reviewed by the Committee in the preparation of its estimate of probable gasoline demand during the 1931 period. As the final result of this study, the Committee has estimated that domestic demand, from April 1 to September 30, 1931, will approximate 222,800,000 barrels, an increase of 1.5 per cent over the domestic demand of 219,589,000 barrels during the same period of 1930.

In the study of probable exports of gasoline to foreign countries, the Committee gave particular attention to the increasing ability of foreign countries to supply the needs for motor fuel outside of the United States and to the realignment of world-wide distribution channels, whereby a certain portion of the foreign demand previously supplied from the United States will be met by shipments from producing centers in foreign countries.

Considering the quantities of gasoline entering foreign trade from the major shipping countries, it appears that the United States is losing its relative position in the world gasoline market. Although gasoline exports from the United States increased from 43,300,000 barrels in 1927, to 63,200,000 barrels in 1930, shipments from other major producing countries have been increasing at a more rapid rate.

For a more detailed analysis of this trend, gasoline exports from the United States have been compared with those of the eight other major shipping countries: Netherland West Indies, Netherland East Indies, Russia, Persia, Rumania, Sarawak, Peru, and Trinidad, the countries being listed according to their respective standings as sources of supply. The increase recorded for the United States in 1930 was approximately 5,000,000 barrels less than that for 1929; while the 1930 increase recorded for the other eight countries was approximately 5,000,000 barrels more.

Another factor of importance in the consideration of probable exports from the United States is the realignment of trade channels in the world gasoline market, whereby quantities of gasoline, comparable with those previously shipped to the United States, will be routed to other countries previously served from this country, thereby reducing, to a corresponding degree, the quantities exported from domestic ports. In addition, the present competitive ability of certain foreign producing countries will result in some reduction in United States exports.

From its consideration of these several factors, the Committee estimated that gasoline exports from the United States during the period under consideration will total 29,200,000 barrels, a reduction of approximately 5,300,000 barrels from the comparable 1930 total of 34,519,000 barrels. For purpose of clarification, it is stated that both amounts include shipments of unblended natural gasoline from California ports to foreign countries.

The summation of domestic and foreign requirements indicates that the American oil industry, during the period under consideration, should not anticipate a total motor fuel demand in excess of 252,000,000 barrels, a decline of 0.8 per cent from the comparable 1930 figure of 254,108,000 barrels.

To meet the estimated total domestic and foreign motor fuel demand of 252,000,000 barrels, the Committee anticipated the receipt of 6,600,000 barrels from foreign sources; the withdrawal of 17,400,000 barrels from storage; the supply of 3,860,000 barrels from miscellaneous sources; and the production of 224,140,000 barrels at domestic refineries.

Estimates based upon a careful study of all reliable data available to the Committee indicate that receipts of gasoline from foreign refining centers will be reduced from the 9,863,000 barrels received during the 1930 period to approximately 6,600,000 barrels during the six months' period of 1931, a decline of 3,263,000 barrels, or 33 per cent.

In the absence of final data, stocks of gasoline held in storage at refineries on April 1 have been calculated to be 48,000,000 barrels. The Committee has estimated that an inventory objective of 30,600,000 barrels for stocks on September 30, therefore, would require a net withdrawal from gasoline stocks of 17,400,000 barrels during the period under consideration. This is comparable with the reduction of 16,985,000 barrels during the same period of 1930. The September objective of 30,600,000 barrels is somewhat higher than the 27,184,000 barrels which the industry reported to the American Petroleum Institute as adequate for working stocks on the corresponding date of 1930. The increase is based upon the assumption that stocks in certain areas should be slightly higher than was reported; that several new plants will require working stocks; and that a greater demand for certain types of premium motor fuel has resulted in the necessity for a somewhat larger inventory than was adequate in the past.

It is estimated that 3,860,000 barrels will be supplied from miscellaneous sources (the production of motor fuel at natural gasoline plants, the addition of benzol, and the unblended natural gasoline shipped from California to foreign countries). Subtracting this miscellaneous production from the estimated total production, there remains the quantity of 224,140,000 barrels as the indicated amount which should be produced at domestic refineries during the period. The American Petroleum Institute Committee, in making a similar estimate, calculated the probable refinery output of gasoline as 224,311,000 barrels. This extremely close accord is typical of the manner in which these two reports, prepared separately by independent groups, are in virtual agreement.

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Having determined the probable refinery gasoline output, the Committee then turned its attention to crude oil requirements to determine the probable crude throughput which would be necessary for the production of 224,000,000 barrels of gasoline. Although many factors are involved, they all lead to consideration of the probable ratio of gasoline output to crude throughput. A careful analysis of recent tendencies in each of the refining areas led to the conclusion that the average production of gasoline, including natural gasoline blended at refineries, will equal 48.365 per cent of the crude run. This is somewhat higher than the ratio of 46.934 per cent effective during the 1930 period, but is below such separate accomplishments as the 50 per cent recovery reported for October, 1930. Applying the ratio of 48.365 per cent to the estimated refinery gasoline production of 224,140,000 barrels, the Committee arrived at the figure of 463,434,000 barrels as the estimated quantity of crude oil which will be required in the production of the estimated gasoline output.

The Committee further estimated that exports of crude will amount to 13,000,000 barrels during the period and that crude used directly as fuel, losses in handling and unaccountable items will add another 15,000,000 barrels to crude oil requirements. The summation of these separate needs gives a total of 491,434,000 barrels as the total estimated crude oil requirements during the period under consideration. Deducting the estimated crude imports of 30,000,000 barrels, there remains the quantity of 461,434,000 barrels as the estimated total requirement of domestic crude oil during the period, or a daily average requirement of 2,521,500 barrels.

There are some possible variations which may result. The decrease in crude oil receipts from foreign countries may exceed the estimate of 3,000,000 barrels. Should this develop, an increased demand for domestic crude oil will be the corresponding result. On the other hand, the quantity of crude used for miscellaneous purposes may not reach the estimate of 15,000,000 barrels; exports may not reach 13,000,000 barrels; or the estimated gasoline recovery may not reach the calculated ratio. There is nothing at present to indicate that such changes will occur, but should they eventuate, probably it will be found that one change largely will be offset by another, with the net result that domestic crude oil requirements will closely approximate the Committee's estimate.

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The domestic crude oil requirement of 461,434,000 barrels is obtainable from current production or by withdrawals from the present storage of crude oil previously produced. The Committee, having estimated the total requirements for crude oil, felt that the decision, as to the quanitity which should be drawn from storage and that which should be supplied through production, is one which may best be determined by the oil industry in each of the producing States, having available the necessary information relative to the quanitity of crude oil held in storage within the State and the relationship existing between local withdrawals and the national total.—*Extracts, see* 3, *p.* 192.

Production Costs

THE average cost of production of crude petroleum at the well, for 1927, 1928, and 1929, in the States of Oklahoma, Texas, Arkansas, Kansas, Louisiana, and New Mexico, from which States is obtained the great bulk of the domestic oil refined along the Atlantic seaboard, was $1.10. The cost of transporting this oil to the Atlantic seaboard was $0.88, including pipe-line charges to Gulf ports, a purchasing charge of 10 cents per barrel, and tanker charges from Gulf ports to the Atlantic seaboard. The total cost of the oil delivered at Atlantic seaboard was, therefore, $1.98 per barrel. This cost is computed on the basis of "company interest oil"—i.e., royalty oil has not been included in total production—and includes interest at 6 per cent on the investment of the companies.

The cost of production of oil in the Maracaibo Basin of Venezuela in 1929 was $0.56 at the point of transfer to ocean tankers. Transportation and other charges necessary to deliver the oil to the Atlantic seaboard were $0.23, making a total of $0.79, cost delivered at Atlantic sea-

board refineries. This figure also is computed on the basis of company interest oil and includes interest at 6 per cent on the investment of the companies.

The commission has made additional comparisons of the domestic and Venezuelan costs. For example, it has compared the 3-year weighted average cost in the United States and in the Maracaibo Basin, Venezuela. On this basis the domestic delivered cost is $1.98, the same figure as that used above, while the Venezuelan is $0.89, made up as follows: Cost at the point of transfer to ocean tankers, $0.65; transportation and other charges, $0.24.

"Delivered cost to the Atlantic seaboard refineries" might also be interpreted as meaning the delivered prices which the refiners pay, since the price paid for crude oil by those who purchase in the open market is tantamount to the cost to them. The commission, therefore, ascertained not only cost at the well plus transportation and other charges to the Atlantic seaboard, as summarized above, but also the delivered prices paid for both domestic oil from all fields and oil from the Maracaibo Basin, Venezuela. The 3-year (1927-1929) weighted average price paid for domestic crude from the mid-continent Gulf area by the Atlantic seaboard refiners was $2.06 and for the Venezuelan crude $1.10. The price paid in 1929 for domestic crude from the mid-continent Gulf area was $2.03 and for Venezuelan crude $1.02.

It is necessary to point out that in comparing the costs of domestic and Venezuelan crudes, articles are being compared which are not similar. The domestic crude, from the mid-continent and adjacent areas, the cost of which is here compared with the Venezuelan crude, had an average gravity of approximately 33° Baumé scale, while the foreign had a gravity of 18° to 19°. The domestic crude refined along the Atlantic seaboard during the period covered yielded, largely by cracking processes, 36 to 44 per cent of gasoline, while the Venezuelan yielded 9 to 12 per cent gasoline and 75 to 83 per cent of fuel oil. Gasoline has a much higher unit value than fuel oil.

The difference in quality of domestic as compared with Venezuelan crude is reflected in the wide difference in the price paid by the Atlantic coast refineries.

The commission has also ascertained the value of the product derived from the two kinds of crude petroleum by the Atlantic coast refineries during each year. In 1929 the value of the products obtained from the domestic crude used was $2.97 per barrel, and from the Venezuelan crude, $1.15 per barrel. There is, however, a decided difference in the costs of refining, the average expenditure per barrel for refining processes being much higher in the case of the domestic than of the Venezuelan crude. The average costs of refining were not, however, ascertained, so that the respective values of the products of the crude over and above refining costs could not be determined.—*Extracts, see* 8, *p.* 192.

World Production

THE world's production of crude petroleum during 1930 reached a total of 1,418,723,000 barrels, a decrease of 65,318,000 barrels, or 4 per cent, from the total of 1,484,041,000 barrels recorded for 1929, according to preliminary figures compiled by the United States Bureau of Mines, Department of Commerce. United States production dropped from 1,007,323,000 barrels in 1929 to approximately 896,265,000 barrels in 1930, a decline of about 109,000,000 barrels, or 11 per cent. Production in countries other than the United States, however, increased from a 1929 total of 476,718,000 barrels to 520,723,000 barrels in 1930, an increase of 44,005,000 barrels, or 9 per cent. United States production, consequently, accounted for 63.3 per cent of the world's total, the lowest ratio since 1921.

Based on annual totals, Venezuela held its position as the second largest producing country, with Russia (U. S. S. R.) in third place. Venezuelan production held very closely to the 1929 figure, but production in Russia reached a total of 135,165,000 barrels, an increase of 31 per cent over the 1929 calendar year estimate of 103,000,000 barrels. During the latter part of 1930, it is reported, monthly production in Russia exceeded that of Venezuela. Persia, Rumania and the Netherland East Indies all recorded increased production, while the decline in Mexican production continued, with the result that Mexico dropped from fourth to seventh place among the world's oil producing countries, with Persia succeeding Mexico in the fourth position and followed in order by Rumania and the Netherland East Indies. Among the smaller producing countries, Germany made the most marked advance, its production exceeding a million barrels for the first time in the post-war period. Bolivia was added to list of crude oil producing countries during 1930.

World Crude Oil Production, 1929-1930

(Figures in thousands of barrels)

	1930		1929	
	Quantity	% of total	Quantity	% of total
United States	898,000	63.3	1,007,323	67.9
Venezuela	137,675	9.7	137,472	9.3
Russia	135,165	9.5	99,507	6.7
Persia	45,420	3.2	42,145	2.8
Rumania	41,680	3.0	34,689	2.3
Neth. E. Ind.	40,150	2.8	38,072	2.6
Mexico	39,530	2.8	44,688	3.0
Colombia	20,346	1.5	20,385	1.4
Peru	12,458	.9	13,422	.9
Trinidad	9,120	.7	8,716	.6
Argentina	8,910	.6	9,391	.6
India, British	8,280	.6	8,366	.6
Brit. Borneo	5,830	.4	5,279	.4
Poland	4,840	.3	4,988	.3
Japan	1,950	.1	2,010	.1
Egypt	1,910	.1	1,864	.1
Sakhalin	1,670	.1	1,076	.1
Ecuador	1,559	.1	1,350	.1
Canada	1,500	.1	1,121	.1
Germany	1,161	.1	711	
Iraq	750		798	
France	520		497	
Czechoslovakia	150	.1	93	.2
Italy	63		44	
Bolivia	56		—	
Other Countries	30		34	
	1,418,723	100.0	1,484,041	100.0

—*Extracts, see* 4, *p.* 192.

Oil Relief Measures in Recent Congress

Embargo Measures

THE Capper Bill (S. 5818) introduced by Senator Arthur Capper, Kans. R., and the Garber Bill (H. R. 16585), introduced by Representative Milton C. Garber, Okla. R., are identical, and provide for the limitation for a period of three years the total importation of crude oil to 16,000,000 barrels a year, and the prohibition of refined products of petroleum for the same period. These are known as the oil embargo bills.

The Capper bill was considered by the Senate Committee on Commerce, which, after holding hearings reported it on February 5, 1931. It was placed on the Senate calendar but did not come to a vote.

The Garber bill was considered by the House Committee on Ways and Means, which held hearings but did not make a report.

Proponents of an embargo or a tariff on oil have announced their intention of renewing their efforts to obtain legislation at the next session of Congress when the Capper and Garber bills will be reintroduced. The one change expected to be made in their provisions is to fix the proposed three year embargo period from 1932 to 1935 instead of from 1931 to 1934 as last session's bills provided.

THE Capper-Garber Bill (S. 5818, H. R. 16585, 71st Cong. 3rd sess.) provides that the importation into the United States of America of crude petroleum, including fuel oil, from and after the passage of this act shall be limited as follows:

During the calendar year 1931 and for each of the calendar years 1932 and 1933 the total importations of crude petroleum shall be limited to, and not exceed, sixteen million barrels for each of said calendar years.

SEC. 2. The total importations of crude petroleum from any one country for each of said three calendar years shall be limited to such proportion of the total of sixteen million barrels as the amount of crude petroleum imported into the United States of America from said country during the calendar year 1928 bore to the total importations of crude petroleum for said year 1928.

SEC. 3. The importation of all refined products of petroleum, including all by-products and fuel oil, except as hereinafter provided, is hereby prohibited for said three calendar years ending December 31, 1933; and all crude petroleum which shall have added to it or blended with it any refined product of petroleum of any kind shall likewise be forbidden entry into the United States for said period ending December 31, 1933.

SEC. 4. Crude petroleum admitted hereunder shall be crude petroleum in its natural composition as produced from wells.

SEC. 5. This act shall not apply to petroleum or to any of the products of petroleum which are imported solely for scientific or experimental purposes, but such imports shall not exceed three barrels for any one shipment, and such imports shall be admitted only under special permits issued under regulations to be made by the Secretary of Commerce.

SEC. 6. The Secretary of Commerce is authorized to make such rules and regulations as may be necessary to carry out the provisions of this act, and it shall be his duty to enforce the provisions of this act, and upon his request the Secretary of the Treasury shall employ the facilities and personnel in his department to aid in the enforcement therof.

SEC. 7. Any violation of this act shall be prosecuted in the district court of the United States of the district wherein the offense was committed.

SEC. 8. If any person fraudulently or knowingly imports or brings into the United States, or assists in so doing, any petroleum or any of the products thereof, contrary to this act, or receives, conceals, buys, sells, or in any manner facilitates the transportation, concealment, or sale thereof after importation, knowing the same to have been imported or brought into the United States contrary to law, said crude petroleum or any refined or by-products thereof shall be forfeited to the United States of America, and the offender shall be fined in any sum not exceeding $5,000 or be imprisoned for any time not exceeding two years, or both such fine and imprisonment.

Tariff Measure

THE Shortridge Resolution (S. J. Res. 238), introduced by Senator Samuel M. Shortridge, California, Republican, was considered by the Senate Committee on Commerce along with the Capper Bill, but was not reported. It will be reintroduced at the next session as it embodies the provisions which those seeking a tariff on oil wish to see enacted.

THE Shortridge Resolution (S. J. Res. 238, 71st Cong., 3rd sess.) provides that there shall be levied, collected and paid—

(a) Upon all petroleum, crude, fuel, or refined, when imported into the United States from any foreign nation, country, or dependency, or subdivision thereof, the sum of $1 per barrel of forty-two gallons, or any such equivalent quantity thereof, however imported.

(b) Upon petroleum products: Kerosene, benzine, naphtha, gasoline, paraffin, paraffin oil, and all other distillates, derivatives, or refined products of petroleum when

Continued on page 192

Should United States Curtail

PRO

by Senator Capper

WE are proposing the limitation of imports of crude petroleum, the prohibition of the imports of fuel oil and refined products of petroleum, for a 3-year period, simply as emergency legislation. We are proposing merely to give the industry a lease on life while we decide what solution of the problem will serve best the interests of the entire country, as well as the industry of the oil industry and those sections of the country in which that industry is located.

It may be that a comprehensive and intensive study of this problem will point to Government control of production. It may be that such study will lead inevitably to Government regulation of pipe-line carriers, their charges and services, along the lines that the railroad rates and services are regulated.

Such a study may develop the necessity for breaking up the present system by which the same ownership controls production, transportation, refining, wholesale distribution, and retail distribution. I am of the opinion that we are going a long way along the several roads I have indicated before we are through with this problem of adequate legislation for the oil industry.

I am thoroughly convinced that petroleum, both crude petroleum and its refined products, should have adequate tariff protection.

I am not exaggerating in the least when I say that the oil industry in this country is facing ruin; and its ruin means business stagnation, lack of purchasing power, unemployment, and poverty for hundreds of thousands of people in the Southwest and other oil sections of the country.

In Kansas thousands of oil workers are out of employment. Whole communities are practically idle, facing ruin, the citizens in these communities facing, many of them already enduring, actual poverty.

And while their own oil, produced by American labor from wells on which they took a chance when they drilled, is unmarketable, they see all over the countryside filling stations selling Royal Dutch Shell gasoline and refined products made from cheaply produced foreign oil, sold for the profit of foreign stockholders in a foreign corporation seeking a world monopoly. Is it any wonder these people are asking what protection their country is giving them? Is it any wonder they are knocking at the doors of Congress asking for immediate relief pending the working out of their problem?

In my judgment this condition is due very largely to the unrestricted importations of cheaply produced foreign oil. Through proration the domestic producers in the United States have held down their production to less than consumptive demands for the past year; in fact, it might be said for several years past, in the interests of conservation of oil reserves and in the interest of self-preservation.

But limitation and reduction of domestic production has not been accompanied by either limitation or reduction of imports or crude and refined products.

The bulk of these imports are made by three big interests—the Standard Oil group, the Royal Dutch Shell, and the Gulf (Mellon) Co. The Standard of New Jersey and the Standard of Indiana are the principal importers in the Standard group. Legally these two are separate companies, so we generally say the Big Four in referring to the importers.

This country's consumptive market for petroleum in round numbers is 1,000,000,000 barrels a year. These companies are importing the equivalent of more than 100,000,000 barrels a year, or approximately 10 per cent of the total consumption.

But this 10 per cent can, and we believe is, used to fix the market price for all crude oil in this country. No independent refiner dares to purchase large quantities of crude in advance when he does not know how much imported crude will be thrown on the market and send the price downward.

These big importers, it must be remembered, are also domestic producers of crude. They are refiners of petroleum. They control a huge network of pipe lines that carry oil also for the independents. Also they engage in wholesale and resale distribution.

These big companies control approximately 50 per cent of the crude-oil production in the United States.

Also they control between 70 and 80 per cent of the refined products, including fuel oil and gasoline, sold in this country.

Now, you can see what a domestic refiner is up against in buying crude. Big companies which sell 70 or 80 per cent of the refined products at any time can throw in enough imported crude, obtained at a very low cost, to break him as a refiner if he has loaded up with crude at a higher price.

To cut it short, this cheaply produced foreign imported oil, while only 10 per cent of the crude in this country, fixes the price for all of it. Its presence or possible entry into the country is a constant threat that holds down the price of crude.

At the same time these importations of cheap foreign oil do not result in lower gasoline prices as might be expected.

When crude oil was selling in the Mid-Continent field at $2.04 a barrel in 1926, the average price of gasoline in 52 cities in the United States was 18.09 cents a gallon. In 1930 when the crude price was $1.29 a barrel, gaso-

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Importation of Foreign Oil?

CON

by Senator Tydings

I APPRECIATE the fact that the oil industry in America is going through a period of suffering, and I do not believe any proof is necessary to sustain that contention. However, may I say that that distressed condition is confined not only to the oil industry; it is more or less general in all lines of industry and individual activity.

Now, assuming, first of all, that a tariff of a dollar a barrel was placed on gasoline. The last figures I saw indicated, I think, there were 980,000,000 barrels consumed in this country in a year; and, assuming that the tariff would be effective, it would mean an increase in price of $980,000,000 a year, which would come out of the pockets of the American people. I respectfully admit that any business in the world can be made profitable if it is going to get its profit in part from taxes taken out of the pockets of the American people.

I will say very frankly that Maryland produces no oil. But I am interested in how much of a contribution Maryland will have to make in order to make the oil industry profitable; and without going into our total population, let me just tell you what it will mean to our Maryland farmers.

I find we have approximately 50,000 motor passenger cars on our farms in that little State. We have about 9,500 trucks on the farms in Maryland. That makes a total of 59,500 motor vehicles on the farms in my State. I am assuming that these motor vehicles will consume 4 gallons of gasoline a day. That will make a daily consumption of 238,000 gallons. Now, assuming that they only run 300 days in a year, that will make an annual consumption of gasoline of 71,400,000 gallons. The figures also show that there are 6,948 tractors on the Maryland farms. I am assuming that they will consume 20 gallons a day when in operation. That makes 138,960 gallons of gasoline which they will consume when in operation. I am also assuming that they only work 100 days a year, which makes a total tractor consumption of gasoline in Maryland of 13,896,000 gallons for tractors, making of all motor vehicles on farms in the State of Maryland an annual consumption of 95,296,000 gallons of gasoline.

I am going to assume, although it may be contended that my assumption is not correct, that any legislation which we may pass will result in giving producers a higher price for their product; and I know enough about economics to know that they can not be paid more for their products than they are now getting without some measure of that increase in price being passed on to the ultimate consumer.

I am also going to assume that whatever legislation we may pass will increase the price of gasoline 2 cents a gallon. That will mean to farmers alone, without going into any of the urban centers in the State of Maryland, an extra cost of $1,705,920 a year.

Now, let us assume that the increase in gasoline is 4 cents a gallon, which I believe is near the correct figure. That will mean that the farmers of Maryland will pay $3,411,840 per year more for their gasoline to operate their trucks and motor vehicles on the farm than they now pay.

And if we assume that the increase in gasoline is 6 cents a gallon, which is not beyond the realms of possibility, under some proposed legislation, it would mean that on the farms of Maryland alone the farmers would be subjected to an additional operating cost of $5,117,760. If you want to tax the farmers of Maryland to let a thousand farmers in the State of Kansas pump a barrel or two of oil into a pipe line a day, let us be frank about it. But do not, for Heaven's sake, come before Congress and say, "We want this, and it will not cost anybody anything," because we know in Maryland we are going to pay our part of the levy to make the oil industry more profitable than it is.

The economic consequences of cutting off foreign trade sometimes are more far-reaching than the immediate benefit may be, because, after all, we might go into the subject that the world owes us $26,000,000,000 in money it has borrowed from the people of the United States.

Let us suppose we cut off all imports. What would become of the $26,000,000,000 owing to us? While we might think for a moment of the benefit through trade, getting more money for our products in America by cutting off all imports, in the last analysis, the ultimate consumer would pay more for his commodities; and, the second conclusion is that, carried to its ultimate solution, we would lose all or a great deal more in foreign debts than they are theoretically now.

In Baltimore there are over 2,000 men employed at 3 plants we have there in the refining of crude oil in the manufacture of asphalt. Now, if all the imports were cut off, so far as I am able to see, it stands to reason that probably all of those 2,000 men, or certainly the major part of them, would immediately be thrown out of employment. While we would theoretically benefit the men who are working in Oklahoma, we would to that extent at least in one city bring about the unemployment of nearly 2,000 men.

If we are going to run the country so that the man with the most brute force gets the bite of bread and the fellow who is not organized, you might say—certainly the consumer and those who are opposed to this proposition are not organized and have not been carrying on the extensive campaign that the oil men have—it simply means that without any fitness we are going to destroy one business and one industry and throw out of employment thousands of men in order that in another part of the country, by artificial governmental processes, another

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Capper *Cont'd*

line in these same cities averaged 18.39 cents a gallon. In 1931, with crude at 87 cents a barrel, the gasoline price is no lower than it was in 1929. All of us are aware of this fact, although the average for these 52 cities is not at present available in exact figures.

In other words, the consumers are not getting the benefit of importations of cheaply produced foreign oil.

These importations are ruining the domestic producers —the independent oil industry in this country is paralyzed today.

The only beneficiaries of these importations are the few big companies—the Standard companies, the Royal Shell, and the Gulf (Mellon) Co.

The situation presents an even greater threat to the future than it does for today, bad as the present situation is.

Continue the present system for a few years, and the independents will largely have to go out of business.

As the independents go out of business, they must cancel their leases. In fact, they are doing that on a large scale today. The owners of the land can not go into the oil-producing business, in the face of the unrestricted importations from South America; probably in huge quantities from Russia within a few years.

The oil reserves of the country then can be gobbled up by the big companies—big companies that produce, that transport, that refine, that transport the refined products, that distribute wholesale, that distribute retail. When these companies, with a monopoly on refining and distribution, also have a monopoly on the oil reserves, then we will have a fuel monopoly in this country that will place the people completely at its mercy.

Also the Government will be completely at its mercy in times of emergency.

This threatened monopoly, which I fear is too nearly accomplished today for the welfare of the country, is the real problem we have to solve, as I see it.—*Extracts, see* 5, *p.* 192.

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by Senator Thomas

A FEW years ago the Government recommended a policy of conservation of American oil, on the theory that it was necessary, or at least advisable, to conserve and restrict American oil for possible future emergency.

The conservation policy of oil, like the conservation policy of coal a few years ago, was thought to be a desirable policy. So far as coal is concerned, the conservation policy was of no practical benefit. Twenty-five years ago President Roosevelt called a meeting in Washington of the coal interests and recommended that means be taken to limit and conserve coal for future emergencies, future uses. The time may come when that conference will be looked back to as of great value, but at the present time the coal interests do not appreciate the conference, for the reason that we have practically unlimited coal that is now worthless.

The record made to date shows that we have in sight something like 25,000,000,000 barrels of oil that can be reached. It is a fact that many of the big companies have located fields, have drilled these fields, and have discovered oil, and the rigs have been dismantled and taken away, and the wells have been capped, and the public thinks that only dry holes were discovered. I have positive information that can be verified, that numerous fields are now known to exist. Their value can not be foretold, but they are fields with oil discovered.

The record shows that from shale we have an estimated probability of oil to the extent of 525,000,000,000 barrels.

This record further shows that we have in sight 100,000,000 barrels of oil that can be made from our known coal deposits; oil for all essential uses for a period of 500 years. If that estimate is approximately correct, I think it is a safe policy to pursue up to the present, at least, that we should have no particular fears about the exhaustion of our oil and gas resources. That will be taken care of for a long time in the future, at least.

The policy, then, of saving our oil and our shale and our coal, and securing our necessary oil supplies from abroad, I think is not a good argument to be used in support or defeat of any sort of legislation, because the same argument could be made regarding other matters. We can secure wheat from Russia, Argentina, and other countries, much more cheaply than we can produce it at home, and if it is necessary to conserve our oil supplies and keep them to protect us in emergency, the same argument could be made that we should secure our agricultural products from foreign countries.

The same thing could be said of iron or almost any other commodity. This legislation has for its purpose, aside from bringing relief to a distressed industry, still another purpose. If the legislation be enacted, it would certainly restricts imports of oil to a total amount of 16,000,000 barrels per year. That is an arbitrary figure arrived at by taking 20 per cent of the total imports for the year 1928.

America has lost its export market for wheat, and in order to secure any benefit to the wheat producers, the producers themselves must voluntarily curtail their production of this commodity. We produce about the same amount of wheat the we produce barrels of oil. At the present time, through legislation, the wheat producers of America have a virtual embargo against imported wheat. The oil industry is not asking for a complete embargo. They would like to have it, of course, but they have not been that greedy.

If the oil industry could have the same favorable legislation that the wheat producers have at this time, they would be most happy; but they do not hope for that favorable legislation, and, in fact, they are not asking for it.

In 1929 we produced here 1,007,000,000 barrels of oil. The oil industry has voluntarily prorated or curtailed the difference between that figure and 895,000,000 barrels. So that we have curtailed or prorated; that is, we, in

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Tydings *Cont'd*

group of men may have a little more of this world's prosperity.

And may I further point out that not only would 2,000 men be thrown out of employment, but the ships which carry the oil to the Baltimore refineries fly the American flag, and that means that the sailors and the owners of those ships and the men who work around the wharves, the stevedores, would immediately be thrown out of employment and a great financial loss would come to them.

So far as refining is concerned, let me say that a great deal of this crude oil is used in asphalt and is used in the making of by-products. A large portion goes into gasoline, but a very considerable portion of it goes into the manufacture of asphalt. In the near-by large cities like Philadelphia, Wilmington, Chester, and New York, where a great deal is used in paving, we have a market available.

I do not deny for a moment that the importation of foreign oil presents a serious economic problem with which we have to deal. But certainly the way to deal with it is not to come into the Congress and have an embargo placed on crude oil. Every barrel that you stop coming into Baltimore means that much lost work for the people there; and, therefore, whatever benefit would be derived by other States that produce oil, as a result of Senator Capper's measure, to a proportionate amount would you find this disastrous effect upon those who were engaged in the industry in Baltimore. Whatever benefit the oil men get as a result of this embargo, complete or partial, would cut off the people of Maryland who are now employed, who would be thrown out of employment proportionately as the amount of embargo is increased or decreased.

The picture I have given of the farming conditions in the small State of Maryland, and the proportionate cost from any increase in gasoline, the tremendous increase which will be placed upon our people if multiplied by the whole United States will take from the farmers ten times all the amount of relief which the Congress has voted out of the Public Treasury. If there is any common sense or good business policy in a method of that kind, I can not see it—taking money out of the Treasury in one act to rehabilitate, and then increasing his operating expenses ten times that amount through either complete embargo or a tariff on oil. What is the use of giving the farmer this money with your left hand, if with your right hand you are taking the money back, and then reaching his pocket to get $9 more for every dollar you have given?—*Extracts, see* 5, *p.* 192.

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by Senator Copeland

ANOTHER attempt to place upon the already sorely distressed consumers of this country an additional tax burden is to be made at the next session of Congress. A frank warning has been issued by the members of the Independent Petroleum Association of America, known as the Independents, that they intend to reopen the drive for a tariff on oil. Formal notification of such action was given the public at a recent meeting of the Association at Tulsa, Oklahoma.

As a Democratic member of the Senate, I would be remiss in my obligation to the people of New York and to the other consumers of the nation, were I to remain silent. This effort to increase the profit of the oil producers at the expense of the millions who buy their product will encounter the sternest opposition in both houses of Congress and will, I am convinced, fail. Every Senator and Member of the House will have in his mind a picture of the petroleum products consumer of his state and as for myself, I will enter the fight with a keen appreciation of the added costs that the owners of the 2,307,730 motor vehicles of my own state will be called upon to pay if the attempt to place a tariff on oil is successful.

As a member of the Senate Commerce Committee in 1929, I heard representatives of the Independent Petroleum Association repeatedly deny at hearings, which were held on a bill to place an embargo on gasoline and a sharp limitation of crude oil, that a tariff would result in raising prices. These denials also were made at hearings on the same proposal granted by the Ways and Means Committee of the House.

At the Tulsa meeting, E. B. Reeser, head of the American Petroleum Institute, declared that the object of a tariff on oil is higher prices for gasoline and all products of petroleum, challenging those present to deny this statement. No one denied it.

During the hearings before the Committees of the Senate and the House early this year the so-called Independents repeatedly denied that a tariff would result in raising prices of products refined from crude oil.

In view of the fact that a tariff-caused increase of only 4 cents per gallon of gasoline would cost the impoverished American farmer $340,000,000 per annum, and would cost the American public over $634,000,000 each year, of which the people of my own state would pay $59,160,000, we may expect consumer-opposition in self-defense. The proposal of a high tariff on oil boils down to a bonus payable, first, to the large companies owning over 650,000,000 barrels of stored oil, and thereafter possibly to the royalty owners and so-called independent producers. These tremendous amounts would be collected as tribute paid by the American public and merchant marine through increased fuel prices.

There is no tariff on coal. It is a fuel and a wasting asset. No tariff has ever been placed on oil; it is a universally used fuel and a wasting asset. At the hearings this year exaggerated claims were made, by experts for the tariff proponents, of the petroleum resources of the United States. The claims were convincingly disputed by the evidence of Mr. Mark Requa, an impartial volunteer witness, who stated without contradiction his mature belief that our supply of oil from wells is limited, and that constant drilling and discovery of new fields needed to take the place of the present fields when depleted, will assure us of an oil supply for no more than twenty-five years. Oil from coal and shale is commercially recoverable only when crude petroleum will be selling from 9 to 13 times its present price, and when this time arrives the United States will be paying from $5 to $8 a barrel to foreign companies, principally British, who control the fields outside the United States.

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Thomas *Cont'd*

effect, have laid an embargo effective against ourselves. Now, inasmuch as the importing companies have not only not curtailed or prorated, but have increased their importations, we are asking that they be required by law to do the same thing that the oil industry has already done.

The oil industry is one of the major industries, not only of this country but of the world, and it is getting larger, because oil products are coming to be more and more in demand.

This record, I think, will show that a few companies are now dominating this industry, and the same companies that are dominating the American industry are dominating the world industry. These companies, briefly, are the Dutch Shell, which is the largest producer of oil in the world; the two Standard companies, the Standard of New Jersey and the Standard of Indiana; and the Gulf.

Along with the Dutch Shell we have the Standard and its subsidiaries, and I think third in importance would be the Gulf Co. Within the past year the activity of the major companies has been intensified, and the little fellows have not only felt the grasp of the larger companies but companies heretofore considered to be large companies are now feeling the grasp and the effects of the activities of these major companies.

I think I am safe in saying that, except three or four of these larger companies, the entire list of oil companies in America is behind the Capper bill. Companies last year that were noncommittal and were opposed to a tariff on oil have now changed their position, because of the activities of the larger companies, and are now favoring this legislation.

I cite you the instance of the Prairie Oil & Gas Co., one of the larger operators in the mid-continent field. Formerly this company was supposed to be a subsidiary of Standard Oil. The facts are that at one time Standard personnel owned large blocks of stock in the Prairie Oil & Gas Co. About a year ago, or a little more, one of the Standard companies cut the price of oil in a southwestern field and asked the Prairie Oil & Gas to cooperate with them and likewise cut the price of oil. The Prairie Co. refused to join this Standard subsidiary and refused to cut the price of oil. Immediately thereafter the Prairie Oil & Gas Co. began to feel the effects of competition that they had not theretofore felt. They began to lose their consumers, the persons to whom they had been selling oil. One by one the refineries, consumers of oil, heretofore purchasing from the Prairie, began canceling their contracts, and in a very short time they lost, I won't say all, but a very large majority of the oil that they had been selling. In addition to their contracts being closed and not renewed, competing pipe lines were built into that section. Up until a year ago two or three pipe lines had served the oil industry in taking the oil from that field to the northern and eastern refineries. All at once three or four new pipe lines were announced. They have since been constructed, and now there are no less than six or perhaps seven pipe lines through that field. whereas theretofore there had been but three. These pipe lines are now serving the refineries heretofore served by the Prairie Co.

When the time came that the Prairie had lost this business, with no outlet for its products, nothing to do with the oil, only one thing remained, and that was to serve notice on the owners of the wells from which they had been buying oil that no longer could they buy this oil. As a result of that policy, some thirty or forty thousand wells in that particular area have lost the market for their oil.

That is a concrete illustration of the policy of the larger companies toward the smaller or weaker companies.—*Extracts, see* 5, *p.* 192.

Governors' Oil Relief Conference

WE, the representatives of the petroleum industry, the business interests, and the farmers and laborers of the oil-producing States, duly appointed and accredited by the governors thereof, do hereby solemnly petition and urge the Congress of the United States to enact without delay a law placing an adequate tariff upon imports of crude petroleum and its refined products, or in the alternative we pray that the Congress enact without delay a law limiting the importation of crude petroleum to 20 per cent of the amount imported during the calendar year of 1928 and that in the interest of American labor the law absolutely prohibit the importation of any of the refined products of petroleum, said imports to be allowed only from those countries from which petroleum was received during 1928.

Those engaged in the petroleum industry in the United States have for a number of years exerted themselves to their utmost to solve their own problems.

The success of their efforts to curtail and prorate their production in cooperation with the conservation boards of the various oil-producing States has been frustrated due to the flood of oil coming into the United States from foreign countries.

The price of crude oil has steadily declined, until over 200,000 wells are now and have been for some time producing oil below the cost of production. Notwithstanding the fact that crude oil has declined in the last three or four years, in many instances to less than one-half its former price, and the price at the refinery has likewise declined, there has been no appreciable decline in the price of gasoline and other refined products to the consumer. For example, in February, 1926, Mid-Continent crude oil of 36 gravity Baumé, which is the principal source of our gasoline supply, sold for $2.04 per barrel. At this time the average price of gasoline at service stations, less the tax, in 52 representative cities of the United States, was 18.09 cents per gallon, while in February, 1929, the same quality of Mid-Continent crude oil sold for $1.20 per barrel, and the average price of gasoline, less the gasoline tax, in the same 52 representative cities of the United States was 18.39 cents per gallon.

During the past two or three years, thousands of small wells have been abandoned and plugged, with great economic loss, not only to the owners of these wells, but to

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Copeland *Cont'd*

A tariff on oil would be destructive of conservation. Whatever the contents of our oil measure, it is limited. In the words of the Federal Oil Conservation Board (1930) in its last report:

"It matters not whether the oil reserves of the United States are five times a billion barrels or twenty times a billion barrels, the supply is limited and cannot be increased. Even the most generous estimates place the date at which our oil rseerves will be practically depleted, under present rates of consumption, in the comparatively near future. In the interests of national defense and industrial prosperity this generation should not be permitted to waste this irreplaceable natural product and thus seriously handicap future generations of Americans."

Successive administrations have opposed a tariff on oil on the basis of conservation. To the end of conservation of our own oil resources they have encouraged the acquisition and development of oil fields abroad by American capital. American companies are now importing 90 per cent of all the oil we use from abroad, and imports are only 10 per cent of our total consumption. It is against these companies that the proposal to tax oil imports is directed. This proposal contemplates an abrupt reversal of policy to the enormous damage and destruction of our own pioneer investors.

They are as much a part of our American petroleum industry is are the producers of the west and mid-west. Their productive fields are the economically logical source of motor fuels, and fuel oil for use in the Atlantic-coast States. Their fuel oil and furnace oil markets are here. American steamships putting out for all Atlantic ports use their liquid fuel. The mid-western producers want these markets for themselves; and a tariff on oil would wrest these markets from one group of Americans to hand them over to another small group of Americans, at tremendous and unjustified expense to millions of users.

If tariff legislation is to be enacted at the next session of Congress, it will be aimed at the corrections of the ills attributed to extreme rates in the present Tariff Act. Revision, if made, will be downward. It is against reason to suppose that in the present atmosphere a tariff will be placed upon petroleum which has always been on the Free List, undoing all that has been done in the past to conserve for the American people their most important fuel heritage.

U. S. Bureau of Mines

THE Bureau of Mines feels that there are certain important considerations which should be reviewed in connection with the proposed oil legislation.

Foreign crude oil which is being imported into the United States is predominantly the output of American-owned and operated companies. In its third report, the Federal Oil Conservation Board stated that "The present imports of Mexican and South American crude oil come largely from American operators and, while not obtained from United States oil sands, they are the product of American engineering and enterprise."

It would appear that these American companies consistently received the assistance of the United States Government in their efforts to explore and develop oil lands in foreign countries. Special attention has been given to possible restrictions imposed on United States citizens in the acquisition and development of foreign oil lands and to the establishment of the "open-door policy" in mandated areas. Discussing foreign oil sources in its first report, the Federal Oil Conservation Board advised "that our companies should vigorously acquire and explore such fields is of importance, not only as a source of future supply, but supply under control of our own citizens."

Having thus encouraged American oil companies to develop foreign oil production, in order that other nations would not control an undue share of the world's oil resources, it might be considered that there has been established an implied obligation to continue in the assistance of American companies engaged in foreign oil production and that the restriction or refusal of admission to the United States of the oil so produced would be contrary to the encouragement which these companies have received while engaging in foreign oil exploration and development work.

Such legislation as has been or may be proposed should be considered carefully to estimate its probable influence upon the relative development of petroleum refining industries in foreign countries and in the United States. The ability of foreign refineries to supply foreign demands for petroleum products has been increasing in recent years and, in some instances, the establishment of such foreign refineries has deprived American refineries of markets previously supplied from the United States. Judging from the reported construction of plants in foreign countries, it seems reasonably certain that the number and capacity of those refineries will continue to increase, with the result that, in succeeding years, foreign markets will be even more largely supplied from foreign sources than at present. Therefore, it would seem inadvisable to hasten or stimulate the growth of foreign refineries through the enactment of legislation which would tend to greatly accelerate that development. The prohibition or restriction of crude oil imports into the United States undoubtedly would influence the further development of refining capacities in adjacent foreign countries. This is evidenced by the statement of Sir Thomas H. Holland, in his report on the "Oil Industry of Trinidad," laid before the legislative council on October 19, 1928. (Council Paper No. 86 of 1928.) He stated that "Trinidad has an opportunity now of showing that it is a safe area for the investment of capital in refinery plant to handle the prospective supplies being developed in the Central American region."

He states further:

"Thus, there appears to be no danger in removing the existing import tariff on crude oil; on the contrary there are obvious advantages to the well-being of the colony in declaring this to be the settled policy of the Government,

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Governors' Conference *Cont'd*

future generations, because of the loss of oil reserves. There are now 250,000 wells in America producing an average of 1 barrel per day, and 50,000 wells producing an average of 5 barrels per day, the total daily production from this source amounting to 500,000 barrels. Unless the price structure on crude oil can be remedied, and that without delay, these wells must be abandoned and plugged. They can not be shut down because the encroachment of salt water will destroy them. Once they are plugged and abandoned this source of crude oil will be lost forever, because of the impossibility of economically redrilling the area in which these wells are located. Such an economic and social loss to the people of America is unthinkable.

In addition to the disaster which will befall the owners of these wells, multiplied thousands of those engaged in pumping and servicing these wells will lose their employment, thus adding to our serious unemployment problem. These employees have spent a lifetime in their vocation, and it will be difficult, if not impossible, for them to become gainfully employed in any other.

The revenue which these wells produce and the employment which they furnish is the mainstay of large areas in our country. There is now stored in the United States nearly 700,000,000 barrels of crude petroleum and its refined products, and although the oil producers of our country have radically and drastically reduced their production during the past year, in some instances as low as 1 per cent of the potential capacity of their wells. Because of the importation of oil from foreign countries, the stocks of oil in the United States have declined only about 26,000,000 barrels, and the tremendous loss of crude oil and its refined products from evaporation, because of being stored above ground, can not be remedied as long as oil importations continue.

Not only the laborers engaged in and the capital invested in the oil industry is affected by the deplorable situation in which the oil producers find themselves, but in addition thereto the inability of the oil producers to go forward with their business, and the disaster which faces them, drastically affects the laborers engaged in the manufacture of oil-well supplies of all kinds and character; those engaged in transporting such supplies; the farmers whose products they consume; the mercantile establishments with whom they trade; the laborers who manufacture and the manufacturers who sell to the mercantile establishments in the oil-producing sections; the Indian wards of the Government in the oil-producing States, and so on, forming an endless chain of unemployment, until the plight of the oil industry becomes national in character and directly and indirectly causes loss of employment to hundreds of thousands of our people throughout the Union.

When it is considered that nearly one-third of our national area is contained within the oil-producing States, and that 20 per cent of our population is contained in this area, the dire effects upon the Nation as a whole resulting from the depression now existing in this major industry can hardly be visualized. Our problem, indeed, is national in scope. The oil-producing States and their municipal subdivisions are in many instances largely dependent upon moneys derived from gross-production taxes and oil royalties to defray the expenses of their educational and eleemosynary institutions, and a reduction of the revenue derived from these sources has already seriously impaired the efficiency of these institutions. The injurious effect upon the credit of these States and upon their securities and bonds now outstanding needs only to be mentioned to be comprehended.

It is now definitely determined that our petroleum resources have neither been seriously depleted nor fully developed. As recently as 1915 the United States Geological Survey estimated that the future oil production of the United States would only amount to 7,000,000,000 barrels, but from 1915 to 1929, inclusive, the United States produced 8,912,633,000 barrels of oil—all of the Geological Survey estimate plus 17 per cent. As late as 1925 the Committee of Eleven, composed of the best informed scientists in America, estimated the future production of oil in the United States to be 5,300,000,000 barrels. Since then we have produced more than this estimate.

Conservation legislation and cooperation on the part of the producers have been retarded and rendered of little value because of large importations of petroleum and its refined products. True conservation can never be attained and the present deplorable situation in the oil industry can not be remedied unless either a tariff is placed upon crude petroleum and its products or foreign imports be curtailed and reduced to an amount not exceeding 20 per cent of their 1928 import.

For these reasons we pray that immediate relief may be granted either by the imposition of an adequate tariff, as we have stated in this petition, or else by the speedy enactment of a law imposing those limitations upon the importation of petroleum and the products of petroleum. —*Extracts, see* 5, *p.* 192.

Independent Petroleum Association

by Wirt Franklin, President

IS THE oil industry of this country to continue in the curtailment of production in an ever-increasing degree, while the output of Venezuela and other South American countries continues to absorb the domestic market, without paying 1 cent of taxation to support the Government of the United States, the States, or the legal subdivisions thereof, whereas the domestic oil industry is the most heavily taxed of any industry in the United States, paying first in most States a gross-production tax of 3 or 4 per cent of all the oil and gas produced; a State income tax, a Federal income tax, an ad valorem tax, capital-stock tax, and other taxes too numerous to mention?

But those engaged in importing oil will contend that there should be no tariff on imports, because our exports of petroleum are greater in value than our imports. If this argument is sound and of compelling force, then Congress should, without delay, repeal the tariff bill in its entirety, for on examination we find that on the following products, to-wit, iron and steel, semimanufactured;

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U. S. Bureau of Mines *Cont'd*

having in view the maintenance of the refining industry and the increased longevity of the oil fields."

Once produced, foreign oil will find a market, either as a raw material for the manufacture of refined products in the United States or in foreign refineries in competition with the output of American refineries. The prohibition or restriction of imports of refined products would bar certain foreign gasoline and fuel oil from the United States, but the capacity to produce such oils would still exist in the foreign countries, and it seems apparent that, if barred from the United States, these oils will be marketed elsewhere and, by the quantity that they supplant American oils in foreign markets, they will lessen American exports.

Consideration also should be given to possible tendencies to divert to foreign countries any commerce or trade which at present is within the border of the United States. Should legislation tend to increase fuel oil prices within the United States or to restrict fuel oil imports, some diversion of bunker oil business from the United States to foreign ports might well be expected to follow. The price differential between various major ports is relatively small and any tendency to increase bunker oil prices at United States ports above the level in foreign countries probably would lead to increased bunkering in foreign ports and decreased bunkering at United States ports. Such rearrangements might also have some bearing upon the cost of operating United States shipping. Legislation which would provide for the free importation of fuel oil or other petroleum products into the United States for purposes of reexportation within a reasonable period of time probably would not result in any rearrangement of bunker oil deliveries if it were held that such bunker oil deliveries to ships engaged in foreign trade constituted a reexportation of the oil.

It appears important also to consider the flexibility of the legislative provisions contained in the proposed measures. The oil industry, both in regard to supply and to demand, has proved subject to fairly rapid changes and, for that reason, positive limitations or restrictions over a definite period might become burdensome, or even detrimental, to the American oil industry as a whole, prior to the expiration of the period set by legislation. For example, it might prove desirable to permit the free importation of crude petroleum in order to maintain the operation of certain refining plants. It also might prove desirable to permit the free importation of crude petroleum for purposes of refining, the products of which would be reexported within a reasonable period. Under a plan which would permit such reexportation of refined products, the substitution of equivalent quantities of domestic refined products in lieu of the actual oils obtained from foreign sources, might be contemplated, owing to the difficulty of keeping separate records of the various oils. Rather than establish a complete restriction against importation of all petroleum products, it might prove desirable to limit the importation of one, or a group of refined products, and yet permit the unrestricted importation of other refined products or by-products of the petroleum industry. In a situation where it might prove desirable to limit the importation of gasoline, it might prove desirable to continue the importation of certain petroleum products such as high melting point paraffin wax. These possible situations are mentioned only to illustrate the need for thorough and complete study in order to devise ways which should be provided to meet the varying needs of the petroleum industry.

Some proponents of restrictive oil legislation repeatedly have stressed and have given the unqualified inference that the production from some 300,000 wells in the United States will be irrevocably destroyed, unless those wells are allowed to produce without interruption to the end of their normal lives. It is well recognized that a serious economic condition faces the individual owner of pumping wells. In these wells the lifting costs are frequently many times that of wells where the force for lifting the oil is supplied by the expansive energy of the originally contained or associated natural gas. Lifting costs usually determine the margin of profit for producing crude oil, and when the market is depressed because of an abundance of oil either from flowing domestic wells or from other sources, the so-called "stripper" wells are usually the first to feel this depression. Because of the investment in these relatively small producers and because their owners or lessees, in general, are an essential part of the American oil industry, it seems fundamentally sound that equitable relief should be given.

However, in an honest and unprejudiced analysis of the present economic condition of the American oil industry, it should be recognized that the figures which have been used to designate the number of wells presumably needing relief are largely theoretical. Even assuming that 300,000 wells, out of the total of 328,200 producing wells in the United States (Bureau of Mines figures, as of December 31, 1929), were to be "shut in" for a period of time, present engineering knowledge shows it to be illogical to suppose that all of the production from these wells would be henceforth unrecoverable, thus defeating the true policy of oil conservation. Defective casing and other poor conditioning of wells will invite migration of water and some oil will be trapped in the sands; but to suppose that all of those wells will be ruined if they are not operated is misinformation based upon lack of engineering knowledge regarding the flow of oil and water through sands.

It would seem in line with sound economics and good engineering, that consideration for the relief of the American oil industry should give more serious thought to the benefits which may be effected through operating all of the wells in a given oil pool on an equitable unit basis, whether the production per well be in terms of one or two barrels or thousands of barrels.—*Extracts, see* 5, *p.* 192.

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Associated Industries of Mass.

by Albert R. White, V. P.

IF THERE was any way under the heavens that we could be with our brothers of Oklahoma, California, and Texas, even if it cost us more for our fuel oil and gasoline, we would be with them. I have given this thing very careful consideration since 1916, when my own plant went onto oil. The reason I went onto oil was because I could not get coal. We burn about 200,000 barrels of fuel oil a year. Our plant is in the town of North

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Franklin *Cont'd*

steel mill products; iron and steel, advanced manufacture; electrical machinery; industrial machinery; office appliances and printing machinery; automobiles and other vehicles; animal oils and fats; manufactured cotton, manufactures of wood; pigments, paints, and varnishes; soaps and toilet preparations; photographic goods; scientific and professional instruments, and musical instruments, the imports during the calendar year 1929 were $172,577,000, while the exports from the United States of the same products totaled $1,725,111,000. During the same year the foreign value of imported crude petroleum and refined products was $140,966,000, duty free, while the exports of the same products totaled, in American value, $531,-173,000. Imports of petroleum, both crude and refined, in 1929, amounted to approximately 110,000,000 barrels (about 10 per cent in barrels of the domestic production), while in 1930 it is estimated that the total number of barrels of imports of both crude and refined products will be slightly in excess of 100,000,000 barrels, and the estimated production of crude oil in the United States for the year 1930 slightly in excess of 900,000,000 barrels. The imports of crude oil in 1930 have been reduced, as compared with the year 1929, but the imports of gasoline and other refined products have been so greatly increased as to displace a much greater amount of domestic crude from the market than was the case in the year 1929.

At the time of the last reduction in the price of crude oil in the mid-continent field, which reduction amounted to more than 25 per cent in the then average price, those companies posting the reduced price accompanied the same with the statement that it was made necessary because of competition. Certainly it was not the competition of domestic production, because at the time of the posting of this crude price reduction the cooperative movement to curtail production had reduced the same nearly 600,000 barrels per day in the United States; the companies posting the reduced prices for crude oil, after having promised full cooperation in the proration program, betrayed producers by withdrawing from storage 26,000,000 barrels of oil in the year 1930.

In recent months imported gasoline has been sold in tanker lots in Atlantic seaports as low as 4 cents per gallon. Certainly it must have been the competition of this imported gasoline that made necessary the reduction in price of the domestic product. This reduction in the price of crude oil was followed throughout the United States by an average reduction in the wholesale price of gasoline (which was not passed on to the consumer) of 2 cents per gallon. Granting, for the sake of argument, that the difference in the values of our imports and exports of petroleum products, and the favorable trade balance of $390,000,000 created thereby was all profit, even though that profit went to only four or five huge corporations, and keeping in mind that within the last year the price of 36-gravity mid-continent crude has been reduced more than one-third (50 cents per barrel), how long would it take at 50 cents per barrel, with a daily consumption in the United States at the present time upward of 2,500,000 barrels of crude oil, to entirely account for said $390,-000,000 favorable trade balance from crude-oil production alone? And let us also ask how long it would take at 2 cents a gallon (the amount of reduction in the wholesale price of gasoline in recent months) with a daily consumption of 1,250,000 barrels of gasoline, to account a second time for said $390,000,000 of favorable trade balance?

Again, it is stated that there should be no tariff on imports of petroleum products because it would be detrimental to the interests of the consumers, the buyers of gasoline, that the consumers so far outnumber the producers and refiners and those employed in the petroleum industry that their interests are paramount. However, there seems to be little relation between the price of crude oil to the producer in the United States and the price of gasoline and lubricating oils to the consumer. This can be illustrated briefly by referring to the fact that in Februrary, 1926, in 52 representative cities throughout the United States, the average price of gasoline at the filling station, exclusive of tax, was 18.09 cents per gallon, while the average price of crude oil of 36 gravity Baumé during February, 1926, in Oklahoma and Kansas was $2.04 per barrel. The average recovery of gasoline by the refining methods then in use was 35 per cent, or 14.70 gallons per barrel. In 1929 the average price of gasoline at the filling stations in the same cities, exclusive of tax, was 18.39 cents per gallon, while the price of crude oil of 36 gravity Baumé in Kansas and Oklahoma was $1.20 and the recovery of gasoline by improved refining methods had increased to 46 per cent, or 19.32 gallons of gasoline for each barrel of oil. The same relative price schedules obtained throughout the years 1926 and 1929. The price of gasoline to the consumer has not fluctuated in proportion to the price of crude oil.

Cheap imported fuel oil has caused the price of the domestic fuel oil in the refining centers of the mid-continent field to fall at times below 50 cents per barrel, thus bringing about a very wasteful utilization of this oil, which might better be saved for higher uses than fuel.

I have never contended that a tariff on oil is a panacea for all the ills of the industry. Were imports entirely eliminated we must still proceed with a sane, orderly program of development and operation of our oil fields and by cooperation balance supply with demand, as we have so ably demonstrated we can do—as we have done in the past two years.

I would like to say in closing that we should not be discouraged. We have won much support. The whole petroleum industry, the business, and commercial interests, the farmers and the land-owners of the oil-producing States now present a solid front in demanding immediate relief, and are militantly supporting the program for the exclusion of a foreign oil from the domestic markets, either through the instrumentality of a protective tariff, or if the political exigencies prevent that form of remedy, then by an embargo for a period of years forbidding any importation of oil products whatever.—*Extracts, see* 7, *p.* 192.

by Ralph Arnold

IN 1914, in connection with a course of lectures I was giving at the University of Chicago, I got out some estimates of the future oil reserves in the United States. I said at that time I thought the United States would ultimately produce from eight to nine billion barrels of oil.

There were a number of others who were making guesses at the same time, including the United States

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White *Cont'd*

Dighton, Mass., which is adjacent to the city of Taunton. The city of Taunton owns its own municipal lighting plant and power plant. They burn about 90,000 barrels of fuel oil a year. Then up above us is the city of Boston, with the Boston City Hospital that burns about 100,000 barrels of fuel oil a year. Then above that is the great Pacific Mills in Lawrence, which burns about 600,000 barrels of fuel oil a year.

I have listened attentively to the proponents of the bill, hoping that they would suggest some way that their oil might be brought to us that we might burn it. So far as it has been stated, I have not heard any way that we could get their oil. I have not heard anybody state that they would put fuel oil on the Atlantic seaboard, in Boston or Providence or Fall River or New Bedford, for $1.05 a barrel.

Illustrating why we can not use their oil: If we have our oil coming from Venezuela into the port of Providence we pay $1.05 a barrel. If we put that barrel of oil on a tank car and move it to North Dighton, a distance of 25 miles, it costs 34½ cents to move that barrel of oil 25 miles, and it has been brought up from Venezuela for about 24 cents. Now, that applies just the same on coal. If we buy a long ton of coal alongside of Providence it costs us $1.05 to move that inland on train 25 miles. We can haul it with a truck for 50 cents. So we had to give up the railroad for transportation, and we move our oil in tank wagons and trailers. It costs us about 5 cents a hundred pounds, and that means about 15 cents a barrel to move it. We were not satisfied with that, so we went to Congress and asked Congress to give us an appropriation to dig out that river so that we could bring our oil and gasoline up the river to our trade. Congress appropriated $780,000 and the State of Massachusetts appropriated another $100,000, to bring gasoline and fuel oil up the river to the Taunton municipal lighting plant, to our plant, and to the plant of the Taunton Gas Light Co. Now, that oil can be moved up the river from Providence for 5 cents a barrel as against 15 cents we now pay to move it by truck. So naturally we are anxious to see that river deepened so that we may have this transportation.

Now, as to coal: Coal is $5 a long ton. Four barrels of heavy oil ought to do the work of a ton of coal. At $1.05 that means our fuel costs for oil are $4.20 as against $5 for coal, so we are still safer to burn oil than we are coal and we are sure of a constant supply. Doctor Ralph Arnold has stated that some years back he made an estimate of what we had for oil reserves in this country, and that estimate was entirely wrong. You also remember that before the time Doctor Arnold made that estimate these large companies went for concessions in Mexico and Venezuela and Colombia. They did the thing that any business man would do.

Now, later comes Doctor Arnold and revises those figures. He says we have almost an indefinite amount of oil in storage in the ground in this country to be used, but nevertheless the money of these big companies and the money of the public has gone to help develop those fields. It costs, even today, as I understand, 70 cents a barrel to bring oil from California around to the North Atlantic seaboard. Now, in that, of course, is absorbed the cost of toll charge from the canal. It costs 80 cents a hundred to bring gasoline from Tulsa, Okla., to Boston. That is $2.40 a barrel. Now, with the independents being merely producers without transportation, how is this going to change the situation? We have all heard that only 10 per cent of our requirements are imported, and as against that we export two and a half times as much. That is only a very, very small amount.

The international question has been touched, or it has been touched on quite clearly. There is one phase of it that has not been touched on. If you will remember, history tells us that when Balboa came to these shores he came with the sword in one hand and the Bible in the other. Now, is Uncle Sam going to stand with the Monroe doctrine in his left hand and an embargo act concealing a brick in his right hand face Latin America? Can we afford to face the world in that position? We can not afford to take any such position for the small amount involved. These gentlemen in the independent industry have got to work out their salvation as we have got to work ours out in the textile field. We have had nothing but trouble since 1921. We have seen our mills closed.

As a youngster in New Bedford I remember going with my father along those wharves and seeing those rotten hulks of whale ships; those great casks of whale oil left there that could not be sold. So New Bedford turned around and started her cotton mills. Now the cotton mills do not pay. So the oil people are in the same predicament we are in. We have got to work out our salvation some way. If it is necessary to have a congressional investigation to bring this about, then that is the thing to have. As I understand it, the oil men say they do not object to it. Business, of course, is not keen for an investigation because it takes the time of business men, but if that is the solution, and if that will help the Mid-Continent, Texas, and California producers, then I am for it.—*Extracts, see* 9, *p.* 192.

Federal Oil Conservation Board

THE discovery of new fields and of deeper sands in old fields makes necessary some revision of our ideas regarding the supply of oil available to meet future demands. During the last decade every estimate that had been made of the recoverable oil remaining in underground storage has required revision in the light of later increased production factors. The production since the beginning of 1925 has approached the amount of reserves in proved acreage as estimated at that time, and, in the light of experience, most earlier estimates similarly are seen to have been far too conservative. The geologist, with the aid of the production engineer, seems to have proved his own estimates wrong. However, as pointd out in the first report of the Federal Oil Conservation Board, oil is an irreplaceable natural product and the oil resources of the country are limited. Increased production is not an index of the remaining resources, but a record of depletion and a warning of impaired reserves. To provide for the common defense and promote the general welfare the Government and industry must cooperate to protect the newly discovered oil reserves and those previously known from dangerous and too rapid depletion.

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Arnold *Cont'd*

Geological Survey, and their figures more or less checked along that figure. At that time, the deepest wells that were being drilled in the United States were about 5,000 feet. Our knowledge of the different geological horizons which were producing oil was quite limited. The only method we had of working out the underground geology of the possible oil territory of the country was through surface evidence and the evidence that was acquired through drilling wells.

Now I will give you the picture in 1931. Instead of drilling wells 5,000 feet, we drill wells 10,000 feet; instead of feeling, when we have struck an oil sand in a field, that ends the quest for oil in that particular field, we now find, instead of one oil sand we may have five or possibly more different producing sands in the same field. Instead of the recovery methods that were prevalent in 1914, when I made that other prediction, we have recovery methods and have knowledge of the possibility of recovery methods that make us believe we will recover a great deal more out of the sands we have, a greater percentage of the oil, than we thought could ever be recovered in 1914. We also have better methods of discovery of structures under which these oil deposits occur. We have geophysical methods which enable men to go out on the level plains of Texas, or Louisiana, with a seismograph and a torsion balance, and tell you just about what there is under the ground there for three or four thousand feet. They can not tell you whether oil is there, but they can tell you there are certain structural conditions that tend toward the accumulation of oil, if there is any oil in the country.

Now, with all of this added information we have in 1931 over 1914, instead of the possibility of eight or nine billion barrels of oil in the United States—and right here let me say that we have produced 11,500,000,000 already—we figure the ultimate production is about 39,000,000,000 barrels. We have already produced 11,500,000,000, and we have remaining, then, about 27,500,000,000 on this estimate of 1931. Now I want to tag this estimate with that year; because, the more we learn about the oil business, the more it tends to increase our beliefs that the future oil supply of the United States is greater and greater. The free oil sand; that is, the sand from which oil flows freely when you penetrate it with a well—is only one of three sources from which we can count on the future supply of this country. Coals and lignites carry high percentages of liquid hydrocarbons which may be taken from them through processes of refining and distillation. Oil shales carry large quantities of oil that may be driven out through the application of heat. So I am going to bring those two elements into this picture, because they are possible sources of supply.

The oil shales that have already been discovered and mapped and analyzed probably carry about 92,000,000,000 barrels of recoverable oil. The oil coal and lignite deposits in the United States carry about 595,000,000,000 barrels of oil.

The total amount of oil, therefore, that was available originally was about 726,000,000,000 barrels of oil, including these three sources. We have taken out about 11,500,000,000 barrels of oil from the free oil sands, and very little from the oil shales, just an inconsequential amount, and an inconsequential amount from the coals. I will say probably 25,000,000 barrels of oil would cover everything that has been taken out in the coals. That has been a by-product, more or less, of the coke ovens and operations of that kind. So that it leaves us with a figure of 714,000,000,000 barrels of oil as our future reserve. The thing that interests us most is the reserve that is in the free oil sands, and I will confine my discussion to those sources of supply.

The oil industry of the United States has been in existence just 70 years. It started in Pennsylvania in 1859. We figure in that 70 years we have taken out about 33 per cent of the oil supply of the United States—about 11,500,000,000 as compared with the 39,000,000,000. It has taken us 70 years to get out that one-third, or 30 per cent. The oil resources of the oil fields in the United States are not all discovered. We figure, if we go on about the same rate for the next 30 years that we have carried on during this past 8 years, which has been a period of fairly uniform development, we will by that time about have discovered all of the oil fields that it will be possible to discover, and it would therefore take us 30 years more to fully develop our supply.

After these fields have been discovered and developments have proceeded to the point where they have been pretty well drilled up, we figure it will take about 113 years more before the fields will peter out, that is, the oil will have been exhausted to a point where it does not pay to operate any more.

Now, somewhere in those 143 years from now, when the oil supply will give out because of the exhaustion of the present wells, the coal and lignite deposits and the oil shales will gradually come in. The point where they will come in, naturally the economic factor will determine that; the cost of getting oil out of oil sands as compared to the cost of getting it out of oil shales and coals will determine the point at which we will begin to use coal and oil shales. It will cause no economic disturbance whatever when the time comes that we have to begin to use those things. Now those of us who have seen the developments in the past few years in various things, in physics and chemistry, believe that possibly before that 143 years or possibly before the 30 years are out, we will be securing our source of power, and light, and energy from other sources, or through other channels than burning the oil, or the production of steam through the burning of oil.—*Extracts, see* 9, *p.* 192.

by Russell B. Brown

SINCE there is an adequate supply of American fuel oil, available at prices which would impose no hardship upon users, and since there are a sufficient number of American tankers to transport this oil to the American

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Federal Oil Board *Cont'd*

The changed views of the extent of our underground oil reserves show increased potential recoverable totals, and thus indicate a later date of ultimate depletion. Several factors have created these more favorable conceptions of the situation: (1) New and more accurate methods of geological exploration, (2) the discovery of deeper prolific sands, (3) improved operating methods, and (4) the rejuvenation of partially depleted fields.

The application of geophysical prospecting methods to the problems of applied oil-field geology has greatly improved the technique of determining the location, shape, and extent of structures favorable for the accumulation of oil. By the use of methods such as the gravimetric, the magnetic, the seismic, and the electric, many of the hazards of "wildcat" exploration are eliminated and the oil drill may be started with more definite assurance of commercial production.

Deep drilling has resulted in the discovery of prolific horizons at depths which a few years ago were unattainable. Then the drilling of a well to a depth of 5,000 feet was considered an outstanding accomplishment, fraught with extreme difficulty and hazard; today most of the problems involved in reaching a depth of 10,000 feet have been solved.

Deep drilling has resulted in radical changes in specifications for drill pipe and casing and has called for improved engineering methods. Extensive research has produced equipment of satisfactory design and strength to meet these increased demands. The use of steel with special physical properties and the employment of new forms of joints have made possible casing to a greater depth.

To cope with the high temperatures and pressures encountered in the drilling and finishing of deep wells, special study of circulating fluids and cements has been made. Results of technical research in progress indicate that satisfactory circulating fluids which will not froth or otherwise become unsuited for rotary drilling and cements, setting satisfactorily at high temperatures, will soon be available for use in deep wells subject to excessive temperatures.

The improvement in operating technique is constantly increasing the percentage of recovery of oil from the sand and a new interest has developed in some of the older oil fields, from which appreciable supplies of oil are now being recovered as a result of rejuvenation. This means harvesting a second crop of oil, and in the Broadford and Allegheny fields of Pennsylvania alone new methods are estimated to have added 600,000,000 barrels to the ultimate recoverable supply.

Better technique in drilling and completing wells, the rational development of pools without competitive drilling, the maintenance of gas pressure in the new fields, and the restoration of pressure in partly depleted fields are all factors of outstanding importance in increasing the total production of crude oil from the natural reservoirs of this country. This increase in ultimate recovery from fields in excess of the original estimates—which in specific terms referred to the oil "recoverable by the production methods then in use"—together with the discovery of deep prolific sands and new fields, explains the inconsistencies between previously estimated reserves and the enormous quantity of oil produced subsequent to the making of such estimates.

Such revision of estimates does not increase the actual future supply. Expressing these estimates of reserve in years, moreover, introduces into the equation another unknown factor, the rate of consumption, which has not lagged far behind the almost incredible increases in the rate of production. Yet what the consuming public asks is: How long can supply keep pace with demand?

At present the large margin of safety between domestic demand and supply calls for a considerable degree of restraint in producing from newly discovered fields and sands. Never before has there been so large a shut-in production. Many well-informed men in the industry believe that if all the wells of California, Texas, and Oklahoma were opened to full capacity the present daily output, large as it is, might be temporarily doubled. This potential production of oil wisely held in underground storage represents a quick asset that will be immediately available when needed.

The purpose of the several conservation measures urged by the Federal Oil Conservation Board is primarily to delay the coming of the day when an impending shortage of crude oil will cause a radical advance in the prices of the refinery products the public buys. It matters not whether the oil reserves of the United States are five times a billion barrels or twenty times a billion barrels, the supply is limited and can not be increased. Even the most generous estimates place the date at which our oil reserves will be practically depleted, under present rates of consumption, in the comparatively near future. In the interests of national defense and industrial prosperity this generation should not be permitted to waste this irreplaceable natural product and thus seriously handicap future generations of Americans.—*Extracts, see* 10, *p.* 192.

American S. S. Owners' Assn.

by H. B. Walker, Pres.

FOR every ton of freight and for every passenger transported overseas, the ships of our merchant fleet are in competition with the merchant vessels of foreign nations. We know of no other industry which fights for its very existence, not to mention a financial gain, against so many handicaps as does American shipping engaged in foreign trade. Our higher standards of living result in higher building costs and in higher operating expenses, with but one single exception—the cost of fuel and for this reason American shipowners have consistently opposed attempts which have been made to place an embargo or duty upon the imports of crude petroleum. Almost 90 per cent of our seagoing ships use oil as motive power. These vessels consume in the course of a year about 23,-

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Brown *Cont'd*

seaports, the claim that a limitation of imported foreign oil would cause considerable unemployment among those trades engaged in the handling of oil or in manufacturing or in erecting plants to consume it, is left without support. The same quantity of labor, engaged in the same activities, would be required to handle the American fuel oil as is at present engaged in handling the foreign oil, while even larger numbers of American workers, at present unemployed, would find new employment in the production as well as in the transportation of this oil, for which at present an insufficient market exists.

There could be no clearer presentation of the situation which makes imperative the passage of the Capper bill to save the independent oil industry from complete disintegration than the report of the Tariff Commission, which finds that the cost of Venezuelan oil delivered on the Atlantic seaboard is 79 cents per barrel, while the cost of mid-continent oil delivered at the same port is $1.98 per barrel. American producers, employing American labor, paying American wages and carrying American production taxes, can not meet this low price of foreign oil, produced on a smaller initial investment, paying lower royalties, employing cheap foreign labor, and free from the tax burdens carried by American oil. The same logic which has impelled the Congress of the United States to rescue other industries when threatened by an overwhelming influx of cheap foreign goods, applies in the present oil situation, with this essential difference—that the oil industry of the Nation is prostrate already, the application of a remedy having been delayed so long that many producers have been ruined and others forced to merge at prices fixed far below the actual value by those absorbing them, and many hundred thousand of men have been out of employment so long that they are completely destitute.

Some increase in the price of crude oil will naturally follow the limitation on importations of foreign oil now being sought from the Congress of the United States. That, together with the right to supply our own market, is the purpose sought to be achieved through that limitation. Unless such results were attained, there would be no benefit derived from the desired legislation. It should be made clear, however, to the members of this committee that this increase in the price of crude oil is not likely to be passed on to the consumer of gasoline. There are two very good reasons for not expecting such an increase in gasoline price to consumers. The oil from the mid-continent fields of the United States is of higher gravity and gives greater recovery of gasoline per barrel than the Venezuelan oil.

Modern refining methods have increased recovery per barrel from about 36 per cent in 1926 to about an average of 50 per cent in 1930, present refinery recoveries ranging as high as 62 per cent. Refinery profits are greater per barrel than they were when oil prices to the producer were higher, while their profits per barrel for mid-continent oil are higher proportionately than from Venezuelan oil. Actually there has been very little relation between the price of crude oil paid by the producer in the United States and the price of gasoline or of lubricating oils paid by the consumer. This may be demonstrated by the fact of the difference in price of crude oil in 1926 and 1929, as has previously been called to your attention.

As a concrete illustration, one might point out that when $2.04 per barrel was being paid for crude oil in February, 1926, when they were getting 36 per cent recovery, the average gasoline price in 52 representative cities was 18.09 cents, when the price of crude was $1.20 and the recovery much greater; approximately 44 per cent or a fraction higher.

The purpose of those seeking this legislation is not that they might make profits through increased prices paid by the consumer, but, rather, that their business might have the advantage which will be the outcome of enlarged markets. The natural outlets for American petroleum in the United States have been steadily diminished by the substitution of the products of cheap foreign oil. Those markets would be restored through the passage of this desired legislation.

Whatever increase in price results from the substitution of American oil at $1.98 per barrel of 42 gallons on the Atlantic seaboard, for Venezuelan oil of 79 cents per barrel of 42 gallons would not constitute any serious economic problem. It would, however, make all the difference between continued activity and absolute ruin for the many independent producers of petroleum in this country. In view of the fact at 2,000,000 persons are normally employed in the oil industry, with 22,000,000 persons directly affected and dependent upon the success of that industry, the importance of this phase of the question need not be overemphasized.

The proposed limitation of the imports of foreign oil might be considered also as a measure in the interests of true conservation. Cheap imported fuel oil has caused the price of the domestic fuel oil in the refining centers to fall at times below 50 cents per barrel, thus bringing about a very wasteful utilization of this oil, which might better be saved for higher uses than fuel. This cheap fuel oil, coming into competition with coal, has brought serious distress to the coal industry throughout the country, which industry has been compelled to discharge from employment during this time 50,000 American laborers employed in the mines and in the transportation of coal.

There are many precedents for the establishment of the limitation on imports proposed in the Capper-Garber bill. While it is true that the United States joined with various other nations in the Geneva Treaty, which was proclaimed by the President on March 6, 1930, providing for the abolition of import and export prohibitions, limitations parallel to those proposed in this pending legislation have been and now exist.

The drastic character of these regulations which are made a part of the conditions on which licenses to import petroleum or its products into France are based, surpasses any restrictions placed upon importers of goods into this country. They place a limitation on it by requiring you to live there for a number of years before you can engage in business.

The fact that the French limitation on petroleum imports is not designed to protect French oil producers or to restore to employment idle French oil workers, but is merely intended to support an artificial monopoly, marks the difference between the French limitation of exports under the terms of the Geneva Treaty, and the legislation proposed in the Capper-Garber bill, for whose propriety we might refer to the French as one precedent in this case. —*Extracts, see* 9, *p.* 192.

Walker *Cont'd*

000,000 barrels of oil, and the fuel bill is approximately $26,000,000.

It is, therefore, apparent that shipowners have a very real interest in any proposal which will increase the cost of this operating item. Despite statements that the imposition of an embargo or duty upon the imports of oil would not advance the price of fuel, our fears in this respect are fuly supported by a statement made before the Senate Committee on Finance, holding hearings on the tariff bill, by the Mid-Continent Royalty Owners' Association, when it was admitted that the then proposed tariff of $1 per barrel on crude oil and a similar tariff on fuel oil would cost the consumers of fuel oil $200,000,000 per year. According to a statement submitted by this association at this hearing, the consumers of bunker oil, including tankers, would pay in one year approximately $52,000,000 more for their fuel. They are further supported by a statement appearing in the press accredited to the President of the American Petroleum Institute, who, speaking before the Independent Petroleum Association of America at Tulsa, Oklahoma, last month, declared that oil men wanted higher prices for their crude oil, as did refiners for their gasoline and by-products.

We believe that the producers of oil should receive a fair price for their product, but we believe this can be accomplished by means other than establishing an embargo on imports. The placing of an embargo or, for that matter, a duty which, as proposed, is so high as to practically amount to an embargo, on the imports of oil would not decrease the production of oil abroad. It would undoubtedly divert the flow from the United States to other foreign countries, thus promoting to a greater extent the refining of oil abroad, and it can be said without fear of contradiction that the oil so transported would not be carried in American tankers because of their higher construction and operating costs as compared with tankers built abroad and operated under foreign flags. It would also undoubtedly affect our export trade, for unless American producers could sell abroad more cheaply than they sell in the domestic market, our oil exports would vanish.

In this connection it may be well to point out that the total imports of crude petroleum into the United States during the past ten years have been in round numbers 242,000,000 barrels. Our exports have amounted to 469,000,000 barrels, or an excess of exports over imports of more than 93 per cent. It is a further interesting fact that during the past six years the percentage of our supply of oil furnished by imports has been less than ten.

There is a third point which has influenced shipowners in reaching their conclusion, and that is that the duty or embargo on oil imports would place the shipowner, and for that matter other consumers of petroleum products, in the position of relying practically exclusively on American crude production for their entire supply, which while abundant enough at the present time, cannot, we believe, last indefinitely if the entire burden of American demand is placed upon it. According to a report of the Federal Oil Conservation Board dated February 25, 1929, the United States produces approximately 72 per cent of the world's crude petroleum and consumes about 65 per cent, while our known resources are but 18 per cent of the world's total. There has been a tremendous increase in the production of crude petroleum during the past decade —in fact, it seems to us to be an increase out of all proportion to the growth of the demand—and we view this as the chief cause of the oil industry's present problem of oversupply.

by Representative Linthicum

THE major arguments of the proponents of an embargo on the importation of oil and the answers to their arguments as they appear to me at least may be outlined, as follows:

First. Hundreds of thousands of men have been thrown out of work in the American oil fields as a result of the dumping of cheap foreign oil in the American market.

I have seen no evidence to show any such condition. The evidence shows that approximately 18,000 men are out of employment as a result of a gross and constantly growing overproduction of petroleum in the American fields.

Second. Thousands of small wells will be destroyed and their owners impoverished if they are shut down as a result of overproduction.

This unhappy foreboding, repeated by almost all the principal witnesses, is flatly contradicted by the Bureau of Mines of the United States Government. The bureau reports that the temporary closing of many of these wells would be an excellent method of conserving petroleum and that it would not destroy the wells. It is undoubtedly true that some of these small wells represent economic anachronisms.

Third. That American producers are prorating their production at great expense to themselves, while four of the great importing companies are dumping their foreign products onto the American market with the actual intent, or at least the result, of depressing prices.

The official figures of the Bureau of Mines appear to show beyond the question of a doubt, as does the testimony, that while the American producers have been compelled to prorate recently as a matter of self-preservation, the importers have actually been curtailing regularly for years, and that as a matter of cold fact the importers are now curtailing much more severely than are the United States producers as a class.

Fourth. That the importers employ cheap foreign labor and are thereby enabled to lay down oil on the eastern seaboard at a price with which the mid-continent operators can not compete.

The report of the Tariff Commission disposes of this fallacy concerning the values of the imported petroleum, while the detailed testimony of officials of these corporations shows that their properties pay American labor American wages and more, buy nothing but American materials, transport their products in American bottoms,

Continued on page 191

by Robert W. Malone

THE effect of legislation placing an embargo or tariff on foreign oil would, as I understand it, transfer the purchase of large quantities of petroleum, crude and refined, from foreign fields to American fields.

Such diversion would involve a substantial increase in the transport facilities for petroleum and its products within the continental limits of the United States, and that demand would be represented more largely by the need for additional American tanker tonnage.

The effect of such increased demand for American tanker tonnage would prove little short of a boom to one major phase of the American Merchant Marine, which is feeling keen distress and virtual disaster from the importation of petroleum from foreign producing sources.

There are now idle, and laid up for lack of business in various American ports a total of 54 American tankers.

These idle American tankers have a total capacity of about 4,500,000 barrels, this total being reckoned on a basis of a single voyage for each vessel.

The number of tankers currently engaged in operating between the Venezuela-Colombia producing fields and the ports of destination in the United States, is about 80. Preponderantly these are vessels of foreign construction and registry, as obviously would be the case, since, trading from foreign regions, foreign flag vessels are eligible and can furnish transportation at rates with which American tanker owners find it virtually impossible to compete. It should be stated, however, that some of the vessels engaged in such trades are of American ownership and registry, and their presence in these trades can be accounted for by the fact that their owners calculated it to be more advantageous to operate such American vessels, with higher attendant costs, than would be the case to place them in lay-up and substitute for them foreign chartered vessels. About 20, or one-fourth, of the total number of tankers in such trades are vessels of American registry.

The distance in transit between United States Gulf ports of loading and Atlantic ports of discharge is about the same as the distance in transit between Venezuela-Colombia ports of loading and United States Atlantic ports of discharge. Thus, a similar number of tankers of equivalent total tonnage, operating between United States Gulf and the North Atlantic, would transport within the same period of time the same volume of petroleum products as between Venezuela-Colombia ports and the North Atlantic. The number and total barrel capacity of American tankers now idle and laid up ready for commissioning and service whenever a need or demand for them arises, considered in relation to their potential transport capacity over a given period of time—say one year—furnish an adequate presentation of the situation resulting, in so far as tanker transportation is concerned, should the pending commerce restriction measure result, as expected, in the diversion to American producing sources. Generally a tanker will complete a round voyage between United States Gulf ports of loading and North Atlantic ports of discharge, within a period of 20 days, and such a vessel actually will complete 18 such voyages within the space of one year. By considering the total barrel capacity of the American tankers now idle as reflected by the list, and having regard to the ability of such vessels to complete the aforestated number of 18 voyages per annum, it is apparent that American tanker tonnage presently idle is sufficient to insure the transport, between the Gulf and North Atlantic regions of the United States, of roughly 81,000,000 barrels a year.—*Extracts, see* 9, *p.* 192.

by Orville Bullington

IT IS urged by the American Steamship Owners' Association that the passage of this bill will divert to foreign ships and foreign routes a considerable volume of oil now moving to this country in American bottoms. The truth is that if foreign oil is prevented from coming into America, crude and fuel oil and other refined products will have to be transported exclusively in American bottoms due to the fact that the movement would be from one American port to another, and under the law only American bottoms can engage in coastwise shipping along the coast of the United States. As it is now, foreign bottoms can and do move this oil from foreign countries to American ports, but the passage of this bill would stop the use of those foreign bottoms and give employment to American seamen at American wages and also give these seamen the protection afforded them under the terms of the La Follette seamen's bill instead of, as now, allowing foreign bottoms to bring in foreign oil to American ports and thereby deprive American seamen and American railway workers of employment.

It does not become an industry that has received as much help in the way of subsidies and support and favorable legislation at the expense of the American taxpayer as the American shipowners have received, to ask the Congress of the United States not to pass a bill, so that they may continue to use coolie labor on ships to transport oil from Venezuela to American ports, instead of putting American labor on them.

Other witnesses urge that the passage of this bill will increase the price of fuel oil to those engaged in manufacturing along the eastern seaboard. I do not think it will do that; but, if it does, surely these same manufacturers who have been enjoying for generations protection against the destructive effects of foreign competition will not begrudge to the oil-field worker, the domestic purchaser and refiner the small benefits which may follow from the passage of this bill limiting the imports of foreign oils. Certainly we do not for one moment believe that the workers who are engaged in the plants of these manufacturers agree with the position taken by the owners of the plants in which they work. In fact, the position of the workers in these factories is evidenced by the support which the American Federation of Labor and the railroad brotherhoods are lending to this bill and I am sure that these manufacturers do not realize that by opposing this bill they appear to be assuming a "dog-in-the-manger" attitude in trying to deny to the worker in the oil fields and the domestic producer and refiner the protection against destructive foreign competition which they have so long enjoyed and claimed as an inalienable right.—*Extracts, see* 9, *p.* 192.

Linthicum *Cont'd*

and that the only foreign labor employed is that which clears the jungles and does other chores unknown in the mid-continent oil fields.

Fifth. That there is no relation between the price of crude oil and gasoline, and that therefore the farmer need not be disturbed lest his tractor-fuel bill be increased nor the 20,000,000 owners of automobiles in the country be disturbed lest their gasoline bills jump 20 or 25 per cent as a result of an embargo or a prohibitive tariff.

This astounding premise, vacating, as it proposes to do, the laws of supply and demand, is based apparently upon two isolated instances over a period of years and calmly puts aside the detailed reports prepared by various Government agencies as well as generally accurate organizations, such as Standard Statistics.

If a study of these reports shows anything, it shows that an embargo or a prohibitive tariff will add from 4 to 6 cents to the price of gasoline per gallon and from 70 cents to $1 to the price of fuel oil. Three-quarters of a million fuel-oil users on the Atlantic seaboard will help pay this bonus and the American merchant marine will find itself denied the only economy which makes it possible for it to compete with foreign shipping.

There are some 665,000,000 barrels in storage at present, the Bureau of Mines reports, and if a tariff or embargo went into effect there would be a profit of $750,000,000 or $1,000,000,000 in sight for those who own the reserves—the big companies, not the independents.—*Extracts, see 6, p.* 192.

▼

by Robert G. Stewart

THERE have been various statements made to the effect that if an embargo were placed on crude oil that there would be no attendant increase in the price of gasoline, and that the various refiners who purchased crude oil from the different producers would find it unnecessary to advance the price of gasoline by virtue of an increased price in the cost of their crude.

I have been in the oil business for some 15 years, and I have never seen a time yet where within a comparatively short period of time following an advance in crude-oil prices there was not an advance in the price of gasoline. Not necessarily at once, but within a period of time, and that period of time has varied, of course. It is an actual fact that the price of gasoline has reflected the price of crude.

There have been very many instances—a statement of that kind needs to be qualified—when the retail markets have brought a decline in gasoline prices before actual crude declines have taken place. But it is a fact that, as a general rule, there is between gasoline and crude-oil prices a certain relation.

The Federal Trade Commission made a report, I think, in 1928 as to conditions obtaining in the oil industry between the years 1920 and 1927, in which they stated in the following words this general situation:

"Gasoline prices were promptly advanced throughout the country whenever there was an increase in crude prices."

When competitive conditions have developed, either by virtue of an overproduction of gasoline or an overproduction of other products, it has brought about a situation where the retail prices were materially reduced. The reduction in the retail prices of gasoline or wholesale gasoline brings a reduction in the price of crude oil, as obviously the refiner can not pay a high price for crude oil when there is a declining price in gasoline.

There are unquestionably fewer men employed in the producing of oil today than were employed at the peak of employment records in the industry. But I feel this way, and I think that the general run of oil men agree with me, whether independent producers or whether representing the interests of the larger companies, that there is too great a potential production in the United States today, and in spite of the fact that all foreign imports might be discontinued and some would develop an increased production materially above the present, that still there would be little need to put additional workers in the oil field to work on the problem of producing crude oil.

I have heard estimates of potential production that vary from 10,000,000 to 15,000,000 barrels per day. The total requirements apparently of American industry today is approximately 2,250,000 barrels per day. We have a potential production varying from 10,000,000 to 15,000,000 barrels. Certainly if we had requirements for an additional 500,000 or 600,000 barrels of crude per day it would not necessitate the drilling of any more wells; it would simply mean turning the valve on at the wells and permitting those wells to produce more oil.

Substantially throughout my experience in the oil business, as a general proposition, there has been an advance of a cent a gallon in the price of gasoline for every 25 cents advance in the price of crude. Those figures, I think, are substantiated by the reports of the Bureau of Mines which have been made from time to time.

As a general proposition, there has been an advance of 1 cent a gallon for gasoline as against each 25 cents per barrel on the price of crude. Roughly, it is determined by the fact that by-products of petroleum do not always immediately react to changes in gasoline prices. Approximately 25 gallons of gasoline are available to a barrel of crude. If you apply the 25-cent advance to the number of gallons available from the number of crude, that amounts substantially to 1 cent a gallon.

The Pan American feels an embargo on oil is not going to help the situation, or that a tariff on oil will not improve the situation. We have agreed with the different producers in Venezuela as to restriction of production, and you can see a reflection in decrease of production in Venezuela from the fact that 1930 shows less import of petroleum products into the United States than 1929, and that absolutely in spite of the fact that there was increased consumption in the United States in 1930 as compared with the year 1929.—*Extracts, see 9, p.* 192.

Tariff Measure *Cont'd from p. 175*

imported into the United States from any foreign nation, country, or dependency, or subdivision thereof, 50 per centum ad valorem. The ad valorem rate provided in this subparagraph shall be based upon the American selling price, as defined in subdivision (f) of section 402, Title IV of the act of June 17, 1930 (46 Stat. 590), of any similar competitive article manufactured or produced in the United States. If there is no similar competitive article manufactured or produced in the United States then the ad valorem rate shall be based upon the United States value, as defined in subdivision (d) of section 402, Title IV of the act of June 17, 1930 (46 Stat. 590). For the purposes of this subparagraph any petroleum product provided for herein shall be considered similar to or competitive with any imported petroleum product which accomplishes results substantially equal to those accomplished by the domestic product when used in substantially the same manner.

This Month's Contributors

E. B. Swanson, Chief Economist, U. S. Bureau of Mines; Chairman, Voluntary Committee on Petroleum Economics, Federal Oil Conservation Board.

U. S. Senator Arthur L. Capper, Kansas, Republican.

U. S. Senator Millard E. Tydings, Maryland, Democrat.

U. S. Senator Elmer Thomas, Oklahoma, Democrat.

U. S. Senator Royal S. Copeland, New York, Democrat.

Governors' Oil Relief Conference—*(See pp. 166-167).*

Bureau of Mines of the U. S. Dept. of Commerce.

Independent Petroleum Association of America, Tulsa, Okla.

Wirt Franklin, President, Indiana Petroleum Association, Ardmore, Okla.

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Russell B. Brown, Attorney, Tulsa, Okla.; Secretary, Governors' Oil Relief Conference. Recently appointed permanent Washington representative, Independent Petroleum Association of America.

H. B. Walker, New York City, President, American Steamship Owners' Association.

U. S. Representative John Charles Linthicum, Maryland, Democrat.

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Robert W. Malone, Marine Consultant, Washington, D. C.

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4—World Production of Oil. Report, U. S. Bureau of Mines.

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6—*Congressional Record,* March 2, 1931.

7—*Congressional Record,* March 4, 1931.

8—Report of U. S. Tariff Commission, Feb. 7, 1931.

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10—Report of Federal Oil Conservation Board, May 28, 1930.

Additional Sources for Oil Information

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U. S. Department of Commerce, Washington, D. C.
Bureau of Mines.
Bureau of Foreign and Domestic Commerce.

U. S. Tariff Commission, Washington, D. C.

American Petroleum Institute, 250 Park Ave., New York City, N. Y.

Standard Oil Co., New Jersey, 26 Broadway, New York City, N. Y.

Pan-American Petroleum and Transport Co., 122 East 42nd St., New York City, N. Y.

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